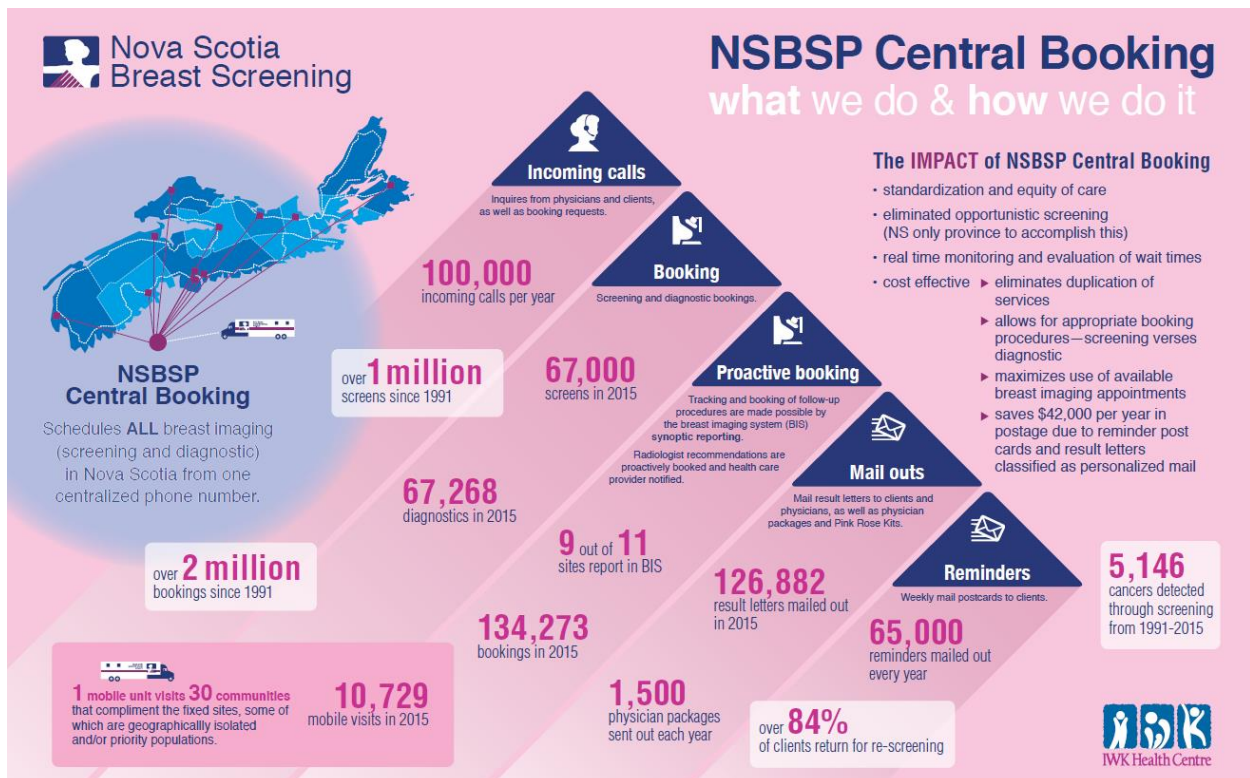


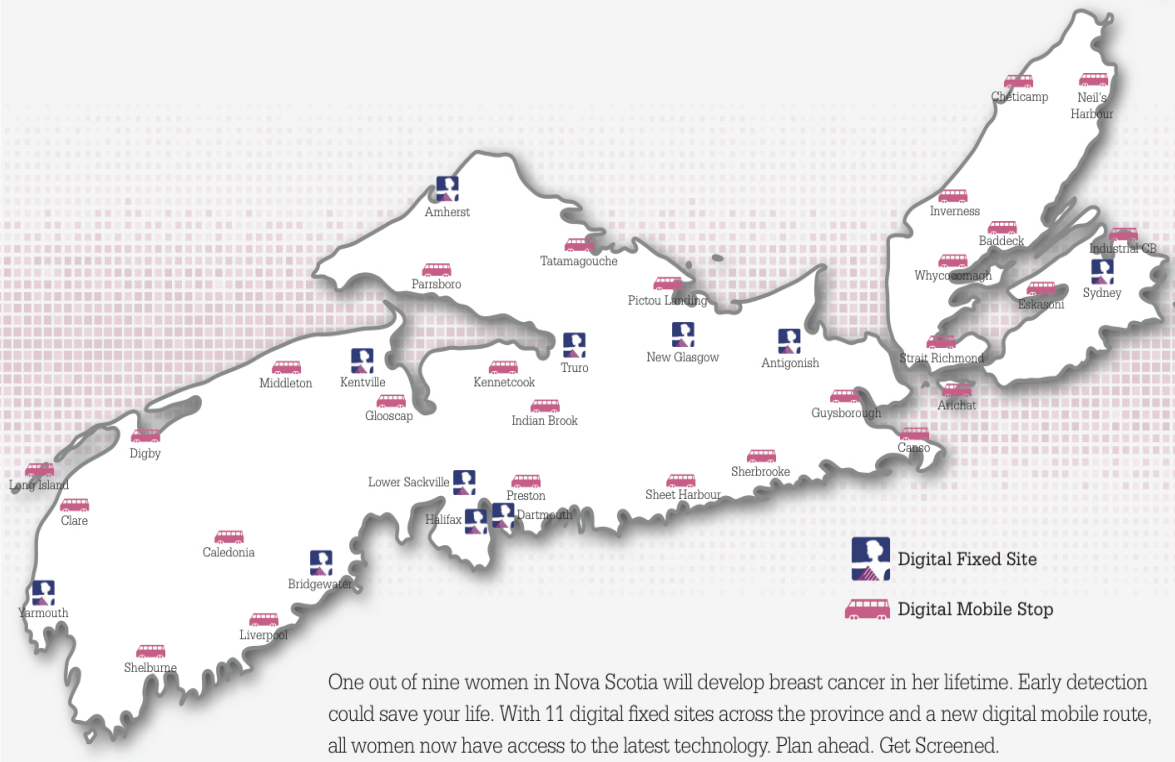
Nova Scotia Breast Screening Program

Annual Report 2017 (2016 Data)



Nova Scotia Breast Screening Program

Plan Ahead. Get Screened.



One out of nine women in Nova Scotia will develop breast cancer in her lifetime. Early detection could save your life. With 11 digital fixed sites across the province and a new digital mobile route, all women now have access to the latest technology. Plan ahead. Get Screened.

For more information call 1-800-565-0548 or visit breastscreening.nshealth.ca



DR. JUDY CAINES - MEDICAL DIRECTOR OF NSBSP 1991-2017 RETIRES



Dr. Judy Caines, who had been the Medical Director of the NSBSP since its inception in 1991 retired on Jan 1, 2017. Throughout these 25 years, under Dr. Caines' direction, it was essential that the pillars on which the program was founded remain consistent: transparency, accountability, standardization, outcome driven, cost effective and most importantly equitable service for the entire province.

The breast screening program expanded from a single fixed site located at the Halifax Shopping Center

in 1991, to 11 fixed sites and a province-wide digital mobile mammography unit that services 30 mobile locations. This ensures that all women in the province have access to the same high quality breast imaging and the follow up and tracking of all abnormal findings.

Nova Scotia (NS) is the only province in the country that has incorporated all breast imaging (screening and diagnostic) into its breast screening program. Dr. Caines was adamant that an annual report be generated and widely available every year that clearly reflected these pillars. During these 25 years, 1,122,509 screening mammograms were performed on 214,612 women in Nova Scotia, and detected 5,282 breast cancers. The mortality rate from breast cancer in NS went from the highest in the country in 1991 to where it stands now as one of the lowest.

Some of Dr Caines' many accomplishments as Director of the NSBSP include:

- Pioneered the stereotactic needle core biopsy procedure in North America - through its use, Nova Scotia now has the lowest benign to malignant (B:M) ratio for open biopsy in the country, whereas in 1991, NS had one of the highest B:M ratio.
- Developed the Multidisciplinary Approach to diagnosis of breast disease in NS to include radiology, surgery and pathology.
- Included women 40-49 that opted for mammography to be screened in the screening program where they could be tracked appropriately and followed ensuring outcomes were available.
- Eliminated opportunistic screening in NS (all breast screening is now managed under the umbrella of an organized program); this ensures all clients/patients are followed appropriately . NS is the only province to date to have accomplished this.
- Integrated screening and diagnostic breast imaging in the province. Not only is this cost effective, it also decreases the wait time for symptomatic patients. NS is the only province to date to have accomplished this.
- Led the transition from analog to full field digital mammography for all breast imaging sites in NS, ensuring that NS was utilizing the latest technology.
- Advocated for a single vendor for all breast imaging in the province, to ensure all sites had the same high quality breast imaging and standardization that was reproducible from site to site.
- Through her insightful vision, led the development of an extensive breast imaging database which enabled the tracking and follow-up of all breast imaging procedures.
- Developed province-wide Central Booking, where all breast imaging appointments are scheduled centrally, ensuring that breast imaging procedures are booked accurately (i.e. screening and diagnostic mammography) and at the appropriate interval
- Developed NSBSP Patient Navigation in 1991 for screening patients; it became a permanent position in 1997 and navigated both screening and diagnostic breast imaging patients. The Patient Navigator ensures women are tracked appropriately and is a resource for both patients and their health care providers

The province of NS has been very fortunate to have such a dedicated and insightful leader for this provincial program all of these years. On behalf of all of NS, the NSBSP would like to thank Dr. Judy Caines for her passion, dedication and commitment to the early detection of breast cancer over the many years. We wish Dr. Caines a long and healthy retirement.

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1 Operational Sites

NSBSP Administration Site and Central Mammography Booking

7001 Mumford Rd

Unit 603L

Halifax, Nova Scotia

B3L 2H8

Toll Free: 1-800-565-0548 (Mobile van, fixed site and diagnostic mammography bookings)

Halifax: 902-473-3960 (9 fixed sites and diagnostic mammography bookings)

Fax: 902-473-3959

Toll-Free Fax: 1-866-470-3959

breastscreening.nshealth.ca

NSBSP PATIENT NAVIGATION

Sarah McCarthy

Toll Free: 1-844-283-0409

Halifax: 902-425-2410

Fax: 902-407-4955

CENTRAL MAMMOGRAPHY BOOKING AFFILIATES

Site 1

South Shore Regional Hospital
90 Glen Allen Dr
Bridgewater, NS
B4V 3S2
Tel: 902-527-5246
Fax: 902-543-9793

Site 3

Valley Regional Hospital
150 Exhibition St
Kentville, NS
B4N 5E3
Tel: 902-678-7381 (2720)
Fax: 902-678-0098

Site 5

Cumberland Regional Health Care Complex
110 East Pleasant St
Amherst, NS
B4H 1N6
Tel: 902-667-5400 (6155)
Fax: 902-667-6307

Site 7

St. Martha's Regional Hospital
25 Bay St
Antigonish, NS
B2G 2G5
Tel: 902-863-2830
Fax: 902-867-4724

Site 9

Dartmouth General Hospital
325 Pleasant St
Dartmouth, NS
B2Y 4G8
Tel: 902-465-8440
Fax: 902-465-8360

Site 9

IWK Health Centre
5850-5980 University Ave.
Halifax NS
B3K 6R8
Tel: 902-473-3960
Fax: 902-473-3959

Site 2

Yarmouth Regional Hospital
60 Vancouver St
Yarmouth, NS
B5A 2P3
Tel: 902-742-3541
Fax: 902-742-5320

Site 4

Colchester East Hants Health Centre
600 Abenaki Rd
Truro, NS
B2N 0C4
Tel: 902-893-5554
Fax: 902-893-5534

Site 6

Aberdeen Hospital
835 East River Rd
New Glasgow N.S
B2H 3S6
Tel: 902-752-7600
Fax: 902-755-2541

Site 8

Cape Breton Regional Hospital
1482 George St
Sydney, NS
B1P 1P3
Tel: 902-567-7788
Fax: 902-567-7812

Site 9

Cobequid Community Health Centre
40 Freer Lane
Lower Sackville N.S
B4C 0A2
Tel: 902-869-6129
Fax: 902-869-6121

2 Vision and Mission

Vision

To enhance the quality of life through the early detection of breast cancer

Mission Statement

To improve breast health among the people of Nova Scotia through high quality, accountable and seamless breast imaging and diagnosis ensuring continuity of patient care.

3 Management & Operations Teams

MANAGEMENT TEAM

Medical Advisor
Program Manager
Vice President, Patient Care & Chief Nurse Executive, IWK
Director of Clinical Initiatives, IWK
Manager, PACS Operations & Applications
Director, Information Technology & Information Management, IWK
Epidemiologist
Consultant Statistician

Dr. Sian Iles
Trena Metcalfe
Jocelyn Vine
Anne Yuill
Rick Nickerson
Andrew Munn
Dr. Jennifer Payne
Prof. Mohamed Abdoell, Diagnostic
Radiology, Dalhousie University

OPERATIONS TEAM

Administrative Assistant		Monahanna McDonald
Promotion and Navigation		Sarah McCarthy Laura Lee Allain Linda Jobe Treena Landry
Data Management		Sarah McCarthy
Data Analyst		Olivia Tong
PACS Specialist MIS/BIS		Robert MacDonald
Radiologists	QEII HSC (Halifax)	Dr. Jo Yazer Dr. Joy Borgaonkar Dr. Robinette Butt Dr. Lori McDonald Dr. Sian Iles Dr. Peter Brown Dr. Heather Curtis
	CBHCC	Dr. Nadeem Shrafat Dr. Syed Raza
	YRH (Yarmouth)	Dr. Beth Furey Dr. April Moore
	CEHCC (Truro)	Dr. Nancy McNeil Dr. Eric Versnick Dr. Skyz Do Dr. Lynette Foster
	SSR	Dr. Arthur Marshall Dr. Chen Meng Dr. Sangeeta Kalyan Dr. Eva Barkova
	VRH	Dr. Michael Dunn Dr. David Acton Dr. Maureen Madigan Dr. Ryan MacDougall
	AH	Dr. Dan Hoffman Dr. Ronald MacEachern Dr. Magdalena Biernacka Dr. Daniel Petrie
	St. MH	Dr. Brian Nicholson Dr. Mike Silver Dr. Blair MacDuff Dr. Jo Yazer
	CRHCC	Dr. Sanjeev Kaul
Technical Contacts	IWK CBHCC YRH CRH DGH CRHCC SSR VRH AH STMH HFXCL	Susan MacKenzie Laura Lee Allain Treena Landry Linda Jobe Susan MacKenzie Sandra Rose Linda Roy Cheryl Crowe Dona Ripoll Crystal Smeaton Denise Wright

4 Executive Summary

The Nova Scotia Department of Health & Wellness established and funded the Nova Scotia Breast Screening Program (NSBSP) as a provincial program in 1991. Nova Scotia was the 5th province in Canada to offer organized breast screening. All ten provinces and two of the three territories now have an organized breast screening program. Nova Scotia is in a unique position in that all breast imaging in the province, screening and diagnostic, is captured under the umbrella of the provincial breast screening program in a single database. This total population capture has eliminated opportunistic screening in this province and allows for population-based decision-making to be well informed and supported.

As of December 31, 2016 1,122,509 screens have been performed on 214,162 women finding 5,282 cancers. Cancer detection rates for this period can be seen in table 4.1. The combined screening + diagnostic participation rate in Nova Scotia for women 50-69 is currently 63.1%.

Full Field Digital Mammography (FFDM) has been implemented in all fixed sites, screening and diagnostic, across the province. Included in the FFDM rollout was the implementation of the Diagnostic Reporting System (DRS) throughout the province. All but three sites (3, 4, & 7) are utilizing the DRS to report diagnostic breast imaging. Complete tracking of diagnostic breast imaging for all patients at these sites is not possible at this time. It is anticipated that all sites will be reporting all breast imaging in the new information system once it is interfaced with the hospital information systems in the province in 2018.

NSBSP has made some great improvements in wait time reporting along every step of the clinical trajectory. Providing the sites with these quarterly reports has resulted in a significant reduction of wait times over the past two years. The wait time for “Abnormal Screen to Resolution without tissue biopsy” is now hovering around the Canadian target of 35 days. This wait was as high as 56 days before the wait times initiative and has dropped to as low as 26 days.

One main goal of the NSBSP is to standardize the mammography process throughout the entire province. “Lack of full organization may result in sub-optimal program operation, performance and resource efficiency.” Progress in Cancer Control: Screening: Canadian Cancer Society/National Cancer Institute of Canada: Canadian Cancer Statistics 2006.

It is through this goal of standardization that the delivery of mobile mammography has been changed. Three mobile units, two film-based and one digital, had been supplementing the 11 fixed screening sites. The purpose of mobile mammography is to service remote and hard to reach populations. Beginning in 2013 mobile mammography was delivered to 30 stops across the province using a single, digital mobile unit and a geosequential approach as well as eliminating duplication of service. This ensured that all women in the province had equitable access to the best screening mammography services available.

Through the systematic use of stereotactic needle core biopsy (a procedure perfected through the NSBSP) Nova Scotia has achieved the lowest Benign:Malignant breast surgery rate in the country. The stereotactic method accounts for 92% of all needle core biopsies performed in Nova Scotia. The remaining 8% are ultrasound-guided. The stereotactic method is performed with a regular mammographic table with an adaptable stereotactic device. This is done as an outpatient procedure, has highly reproducible results and has proven to reduce the number of unnecessary open breast surgeries.

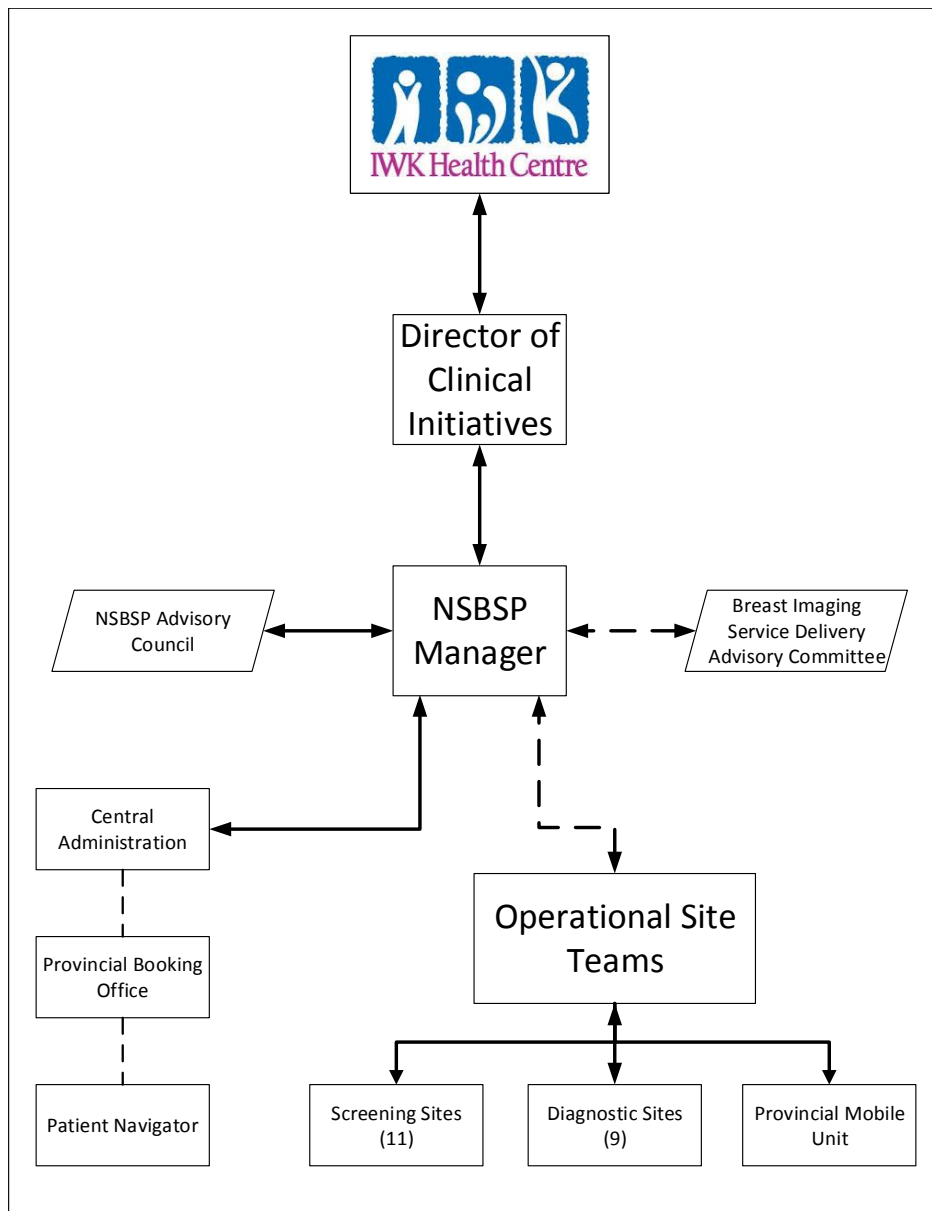
Finally the NSBSP has made great progress in rolling out enhancements to its current information system. A rewrite of the existing system ensures the 25 years of collected data remains intact as the design of the information system changes making it more user friendly and sustainable. The registration and technologist components for both screening and diagnostic have been rolled out across the province in 2015 as well as many of the listings. The radiologist reporting sections have been rewritten and are now used province wide for both screening and diagnostics, and HL7 interfaces for connectivity with the breast imaging system and the hospital information systems are being developed. It is anticipated these will be operational in 2018.

Table 4.1: Cancer Detection Rates (all ages and all years)

Age	# of Cancers	# of Exams	# of Women	Rate per 1000 Exams	Rate per 1000 Women
< 40	0	52	50	0	0
40 – 44	275	141694	65977	1.9	4.2
45 – 49	518	204211	41355	2.5	12.5
50 – 54	730	205595	37559	3.6	19.4
55 – 59	861	182605	25786	4.7	33.4
60 – 64	937	159817	18876	5.9	49.6
65 – 69	968	126083	13474	7.7	71.8
70+	995	102452	11535	9.7	86.3

5 Nova Scotia Breast Screening Program

5.1 NSBSP Organizational Chart



5.2 Central Mammography Booking (CMB) Participants

Table 5.1: Central Mammography Booking (CMB) Participants

Screening Sites (14)		Participation date
Mobile (Province wide) (3)	<i>Mobile 1 (Cape Breton)</i>	<i>Sept 1994</i>
	<i>Mobile 2 (Western)</i>	<i>July 1997</i>
	<i>Mobile 3 (Northern)</i>	<i>Jun 2003</i>
	<i>Mobile 4 (Replaced Mobile 1; single provincial route)</i>	<i>July 2007</i>
Fixed (11)	<i>Halifax Shopping Centre</i>	<i>Jun 1991</i>
	<i>Sydney - Hospital</i>	<i>May 2000</i>
	<i>Yarmouth - Hospital</i>	<i>Apr 2001</i>
	<i>Truro - Hospital</i>	<i>Jun 2002</i>
	<i>Dartmouth - Hospital</i>	<i>Jan 2003</i>
	<i>Amherst - Hospital</i>	<i>June 2004</i>
	<i>Bridgewater - Hospital</i>	<i>July 2005</i>
	<i>Kentville - Hospital</i>	<i>Jan 2006</i>
	<i>New Glasgow - Hospital</i>	<i>Jan 2007</i>
	<i>Cobequid - Community Health Centre</i>	<i>July 2007</i>
<i>Antigonish - Hospital</i>	<i>Oct 2008</i>	
Diagnostic Sites (10)		Participation date
	<i>Halifax</i>	<i>Dec 2000</i>
	<i>Sydney</i>	<i>May 2001</i>
	<i>Dartmouth</i>	<i>Apr 2003</i>
	<i>Truro</i>	<i>Apr 2004</i>
	<i>Yarmouth</i>	<i>Apr 2005</i>
	<i>Bridgewater</i>	<i>July 2005</i>
	<i>Ahmerst</i>	<i>Jan 2006</i>
	<i>Kentville</i>	<i>Jan 2006</i>
	<i>New Glasgow</i>	<i>Jan 2007</i>
	<i>Antigonish</i>	<i>Oct 2008</i>

6 Strategic Planning

6.1 Restructuring of the Provincial Programs

The restructuring of the health care system in NS which began in 2014 resulted in the 9 former health authorities and the IWK Health Centre being consolidated into two health authorities as of April 2015; The Nova Scotia Health Authority and the IWK. The second phase of this restructuring resulted in a redesign of the Department of Health and Wellness.

The new structure has four branches: investment and decision support; system strategy and performance; corporate service and asset management; and client service and contract administration.

This new structure allows for the Department of Health and Wellness to focus on setting priorities, measuring results, and getting out of the operational management and delivery of health services.

As part of these changes, the responsibility and accountability for the following six provincial programs shifted from the DHW to the Nova Scotia Health Authority as of April 1, 2016.

- Cancer Care Nova Scotia
- Cardiovascular Health Nova Scotia
- Diabetes Care Program of Nova Scotia
- Legacy of Life
- Nova Scotia Provincial Blood Coordinating Program
- Nova Scotia Renal Program

The Reproductive Care Program of Nova Scotia and the Nova Scotia Breast Screening Program now reside under the IWK Health Centre.

No changes have been made to the reporting relationship with the Nova Scotia Hearing and Speech Program and the Nova Scotia Trauma Program.

6.2 Provincially Supported Screening Mammography Policies

With 100% participation of provincial mammography sites, further standardization of policies and procedures has become a priority. In past years, measures implemented with provincial approval include:

- involvement of the 40-49 and over 69 age groups
- mandatory site accreditation for all participating NSBSP sites
- evidence-based reporting intervals
- mandatory program evaluation

6.3 Programmatic Screening of Ages 40-49

In 1993 it was recognized that women themselves were demanding mammography at age 40 and appropriate tracking mechanisms did not exist for these examinations. Until further meta-analyses are published on the subject, NSBSP (after consultation with the Department of Health & Wellness) determined these women should be able to self-refer for screening mammography. Automatic recall on an annual basis for women 40-49 was instituted in 1995. Current evidence suggests screening the 40-49 age group is beneficial providing that quality assurance aspects of the program are in place and outcomes can be monitored.

One study from Sweden compared the breast cancer mortality of women who were invited to screening at ages 40 to 49 years (study group) and women in the same age group who were not invited (control group). The results from this study, *Effectiveness of population-based service screening with mammography for women ages 40 to 49 years: Evaluation of the Swedish Mammography Screening in Young Women (SCRY) cohort*, were published in *Cancer: n/a. doi: 10.1002/cncr.25650*.

This study took place between 1986 and 2005. Results of this comprehensive study showed that screening was an efficient resource in the reduction of breast cancer mortality for women ages 40 to 49 years old. Similar feasibility studies are also in progress in other European countries. These trials recognize that if early detection of breast cancer is to be effective in younger women, the intervals between screen episodes must be shorter.

7 Requirements for a Breast Screening Program

Breast Cancer is an important health problem which has a recognizable latent or early non-symptomatic stage. The screening test must be efficacious (sensitivity and specificity) and acceptable, and diagnosis and treatment must be acceptable with facilities available. The cost must be balanced against medical care funding as a whole and should be ongoing. WHO 1968, Criteria for Screening Program.

7.1 CAR Accreditation

The Nova Scotia Breast Screening Program has been instrumental in encouraging high quality mammography through accreditation of staff and equipment by the Canadian Association of Radiologists (CAR). NSBSP has taken a lead to promote this process. It is one of many organized steps towards achieving and maintaining favorable program indicators. All mammography sites in Nova Scotia are currently accredited or in the process of reaccreditation. Re-accreditation is required every three years. Presently the CAR has increased the required number of screens from 480 to 1000 per radiologist.

In 2005, it became policy in Nova Scotia that fees for mammography services would not be paid by the province unless CAR accreditation and a process for accreditation maintenance is in place. This policy was supported by the Nova Scotia Association of Radiologists, the Medical Society of Nova Scotia (Doctors, Nova Scotia), and the Department of Health & Wellness.

7.2 Radiology Reading Volumes Study

Nova Scotia was one of the provinces contributing data to the Pan Canadian Study by a working group of the Canadian Breast Cancer Screening Initiative. This study was to look at cancer detection rates and radiologist performance, in relation to volumes of mammograms interpreted. The results from this study, *Organized Breast Screening Programs in Canada: Effect of Radiologist Reading Volumes on Outcomes*, were published in *Radiology: Volume 238: Number 3, (809- 815) - March, 2006*.

The working group concluded that cancer detection did not vary with reading volume. The average Positive Predictive Value (PPV) for individual radiologists improved as reading volume rose up to 2,000 mammograms per year; it stabilized at higher volumes. In North America, the absolute minimum reading volume requirements are quite low, at 480 mammograms per year; the preferred minimum of reading volume is 1,000 mammograms per year (CAR Mammography Accreditation Program). In contrast, the minimum requirement in Australia and the United Kingdom is 2,000 and 5,000 per year, respectively. (Coldman et al. (2006) *Radiology* 238 (3): 809-815)

The Nova Scotia Breast Screening Program utilized the 3,000 case reading volume as its guideline from the beginning of the program in 1991. Based on NSBSP outcome results and a British Columbia study *Standardized Abnormal Interpretation and Cancer Detection Ratios to Assess Reading Volume and Reader Performance in a Breast Screening Program; Radiology 2000; 215: 563-567*, NSBSP lowered the reading volume recommendation to 2,500 per year in the year 2000. Future recommendations for NSBSP policy change in this area will be based on further NSBSP analysis.

7.3 Double Read System

Since the beginning of the program every tenth screening mammogram has been selected for a second interpretation by a different radiologist. These cases are computer selected and this process requires that these images be re-read following reporting sessions. Radiologist scheduling must be taken into consideration to avoid delays. In addition to this formal approach, an unofficial double read system has been encouraged and may include peer review at a different hospital. Although this is work intensive for the entire NSBSP team, it has been done with the notion that it decreased work-up rates and is in the best interest of the clients. A study was conducted in 2012 that examined the outcomes from double read cases. Results from the study found:

- Double reading of screening mammograms resulted in increased work ups in all age groups regardless of screen order or technology
- Double reading also resulted in increased cancer detection in women aged 50-69
- Double reading may be more beneficial in certain subgroups (Subsequent screens or women aged 50-59) of the screening population to help increase cancer detection without adding too many additional workups
- Limited data on “digital only mammography” demonstrates trends consistent with those seen in the full data set

7.4 Annual Radiologist Mailing

Each year radiologists associated with the program receive feedback containing their individual cancer detection rates and positive predictive values from the previous year. They also receive combined results for their site as well as the province as a whole. In this way the learning curve trends inherent to the interpretation of screening mammography are directly shared, and can be monitored by each screener for enhancement of results. These ‘report cards’ also serve as a self improvement tool for radiologists.

7.5 New Clinical Breast Exam Policy

After consulting with the appropriate stakeholders in Nova Scotia, respective breast screening programs across Canada, and synthesizing evidence from research literature, the NSBSP has recommended **the discontinuation of modified clinical breast exams in conjunction with screening mammography in Nova Scotia as of January 1st, 2015.**

The decision to discontinue clinical breast exams as part of a screening mammography visit will align Nova Scotia with the overwhelming majority of provincial breast screening programs in Canada.

8 NSBSP Advisory Council

The NSBSP Advisory Council (NSBSP-AC) supports a coordinated, provincial approach to breast imaging by reducing variability in service delivery and practice approaches, improving the uptake of standards and guidelines, and enhancing cooperation in improving identified health outcomes across the continuum.

In 2016 a breast imaging Service Advisory Committee for the province was established by the two health authorities with membership that includes NSBSP Program Manager and Data Analyst. This committee is to serve as a technical, medical and scientific expert advisory group to inform, support and enable standardized, integrated, coordinated, innovative, efficient and people centered breast imaging services throughout the Nova Scotia Health Authority (NSHA) and the IWK Health Center (IWK). In light of this new committee the NSBSP Advisory will need to amend the terms of reference and review its membership in the near future.

With the reconvening of the Nova Scotia Breast Screening Program Advisory Council (NSBSP-AC) in 2013, the NSBSP-AC identified the need to update the existing vision and mission of the NSBSP and develop a strategic plan to provide a framework for planning and decision-making for the next five years.

In August 2013, NSBSP staff and selected members of the NSBSP-AC came together with a consultant (termed the planning working group) to discuss the development of a strategic plan for the Program. A meeting was convened in October 2013 with the NSBSP-AC to adapt/revamp the vision and mission of the Program and to develop strategic directions and outcomes.

The strategic plan for the NSBSP is a document that will be reviewed and updated on an ongoing basis. While the current strategic plan serves as a strong foundation for the NSBSP, it will evolve based on evaluation, new evidence, and the changing landscape and realities within Nova Scotia.

A final report presenting the NSBSP Strategic Plan including the framework, strategic directions, and outcomes has been finalized by the NSBSP-AC.

The finalized strategic plan can be found in Appendix C.

9 Core Business Functions

9.1 Population Health

Increasing the number of mammography facilities (capacity) and standardizing a mammography service province-wide to provide relevant research material for responsible health care reform

9.1.1 Mortality Rates

The most recent actual data for 2014 showed the breast cancer mortality rate in countries with “organized” breast screening programs to be at its lowest since 1950. From 2004 to 2013, incidence rates for breast cancer have stabilized, death rates have declined at a rate of 2.3% annually between 1992 and 2012. There is evidence for improved survival due to the **organized mammography screening programs detecting cancer earlier** and advances in adjuvant therapies following breast cancer surgery. National Cancer Institute of Canada: Canadian Cancer Statistics, 2017.

Decreased mortality of breast cancer requires early detection of the disease as well as prompt and appropriate treatment. For 2017, it is reported that there will be an estimated 26,300 new cases of female breast cancer and 5,000 deaths in Canada. In Nova Scotia for 2017, it is estimated that there will be 730 new cases of breast cancer and 160 deaths. Breast cancer is the third most common cancer in Canada, and is the second most common cause of death among females, accounting for 25% of cancers among females and 13% of female cancer deaths. *Canadian Cancer Statistics, 2017.*

During their lifetimes, 1 in 8 women (12.5%) are expected to develop breast cancer, and 1 in 31 (3.2%) are expected to die from it. Only 32% of breast cancers are diagnosed at age 70 or older, 51% between ages 50 and 69 and 17% under age 50. Amongst all cancer survivors that had been diagnosed with cancer within the previous 10 years, 1% of them are female survivors of breast cancer. *Canadian Cancer Statistics, 2017.*

For 2017 estimated age standardized incidence rates for breast cancer in Nova Scotia are **123/100,000** with an estimated **730** new cases. In 2010, actual data reported **720** new cases for an actual age-standardized **incident** rate of **103/100,000**. Incidence is increasing due to the implementation of breast screening programs and greatly improved methods of data collection both of which NSBSP has been active in developing and promoting.

The *estimated* age standardized **mortality** rate for Nova Scotia for 2017 is **25/100,000** based on **160** estimated deaths.

In Canada between 2010 and 2012, there were **137,000** Potential Years of Life Lost (PYLL) due to breast cancer (9.1% of all causes of PYLL) compared to 94,200 in 2002. With regard for the most common cancers in women and men, the PYLL from breast cancer far exceeded the PYLL from prostate cancer (24,000) reflecting the relatively young age that women die from breast cancer. *Canadian Cancer Statistics 2017.*

The five year net survival ratio for breast cancer cases diagnosed between 2006 and 2008 in Canada was **87%** (87% in Nova Scotia). On average, fourteen Nova Scotia women will be diagnosed with breast cancer every week. On average, three Nova Scotia women will die of breast cancer every week. *Canadian Cancer Statistics 2017.*

9.2 Database Surveillance and Evaluation

Providing quality assessment and provincial outcomes

9.2.1 Nova Scotia Mammography Database

Central Mammography Booking Database (CMB): Includes (1) screening and (2) diagnostic breast imaging booking and follow-up modules

1. **NSBSP Database:** Includes self referred bookings for asymptomatic women ages 40 to 69 and over age 70 (if otherwise in good health). *The Canadian Association of Radiologist's Guidelines for Screening Mammography*.
2. **Diagnostic Mammography Database (DMB):** An improved diagnostic database has been designed to complement the NSBSP database and to provide one provincially standardized diagnostic mammography reporting module with upgraded services. Presently it is in use at the IWK Health Centre in Halifax, Cape Breton Regional Hospital (CBRH) in Sydney, Dartmouth General Hospital (DGH) in Dartmouth, South Shore Regional Hospital in Bridgewater, Aberdeen Hospital in New Glasgow, Yarmouth Regional Hospital in Yarmouth, Cumberland Hospital in Amherst and partially at Colchester Regional Hospital in Truro.

In 2015 the NSBSP rolled out significant modifications to both the registration and technologist components of the existing Mammography Information System (MIS) and the Diagnostic Reporting System (DRS) which has been renamed Breast Imaging System(BIS). These modifications have improved user accessibility, standardization and work flow. The radiologist reporting for both diagnostic and screening breast imaging has also transitioned to the BIS in 2016. Development of the interface from BIS to the hospital information systems will resume now that the radiologist reporting is complete.

The NSBSP guidelines for booking both screening and diagnostic breast imaging are included as Appendix A. A draft copy of the diagnostic breast imaging requisition which must be correctly filled out and faxed to CMB by the referring physician (office), is included as Appendix B.

If resources are allocated for data collection and outcome analysis, it will promote the best possible quality initiatives, staff performance and results at all levels. Timely annual report production has been a significant NSBSP accomplishment, made possible by aggressive NSBSP database development. This has resulted in a yearly effort to close the books on cases, and has also provided organized safe-guards for women to prevent cases from falling through cracks in the healthcare system.

Cumulative, annual and biennial figures and charts are contained in this report. Target age group (50-69) numbers are used when calculating Program Indicators, but other charts and figures include women outside the NSBSP targeted age group. The NSBSP database also ensures that every tenth mammogram has been blind read by a second radiologist. In 2016, 4 women were classified as “Lost to follow-up”, and 7 women with abnormal screening reports refused one or more recommended follow-up procedures, resulting in a status of “Refused”.

From the beginning of the program in 1991, there have been 109 women “Lost to Follow-up” and 126 have “Refused” recommended work-up procedures. These women are therefore classified as non-compliant and are categorized appropriately for the particular screening episode. These cases have been reviewed at NSBSP team approach rounds and many have since undergone subsequent re-screening or diagnostic mammography.

Quality is the key word for successful breast cancer screening. Without a reliable database, the organization is extremely difficult. Providers of screening have a responsibility to insist that the program be well organized. If done properly, the cost-benefit analysis will reveal a reasonable cost per screen and cost per cancer detected.

9.3 Education

Promoting awareness of service availability, breast screening guidelines and the Clinical Practice Guidelines for the Care and Treatment of Breast Cancer.

The NSBSP works closely with the CBCF to educate the public on the benefits of early detection.

9.3.1 The Nova Scotia Breast Screening Program Website

The Nova Scotia Breast Screening website, accessible at breastscreening.nshealth.ca, contains a wealth of information for the general public including background information on the program, program guidelines, various quality initiatives, and information on the screening sites that are part of the program including contact information. Also included on the site are links to the mobile van schedule (always kept current) and various statistics including Nova Scotia Annual Statistics, NSBSP Annual Reports, and Public Health Agency of Canada Biennial Reports.

10 Performance Indicators

In order to achieve reductions in breast cancer mortality and morbidity and to minimize undesirable effects of breast screening, the delivery of organized screening must be of high quality. Performance Measures and Targets were selected on the basis of assessing program progress toward desired goals. The eleven performance indicators met the following criteria:

- data for the measure was regularly available
- data available for the measure was of high quality
- meaningful targets could be defined on an evidentiary basis
- measures and targets would be useful for national comparison
- monitoring on an annual basis would be valuable
- each measure was widely accepted for use in program evaluation

A routine biennial report is produced at the national level using data from the Canadian Breast Cancer Screening Database (CBCSD). Although there are many differences in the manner in which the provinces have set up their individual programs, this monitoring role provides useful feedback and comparisons, as well as a mechanism to share processes and provide definitions. The targets set have provided goals and formats for the ten differently structured provincial breast screening programs in the interest of producing more standardized provincial data reports. In 2006, the Evaluation Indicators Working Group, a sub-committee of the Canadian Breast Cancer Screening Initiative published the document “Guidelines for Monitoring Breast Screening Program Performance”, second edition. A list of eleven performance indicators and definitions can be seen in **section 10.1**.

The NSBSP Performance Indicators for 2013, 2014, 2015 and 2016 plus the 2011-2012 quality indicators from the Canadian Breast Cancer Database can be seen in **Table 10.1**. All Program Indicators are for the target age group (50-69). More information on each indicator can be found on the specified pages.

Additional imaging and interventional indicators are being looked at by some provinces as an overall client-based service delivery measure and program quality exercise. “Future methods should be directed toward developing new screening methods as well as methods of improving the sensitivity and specificity of mammography. Methods of reducing surgical biopsy rates and complications of treatment should also be studied, as should communication of the risks and benefits associated with screening.” *Ann Intern Med*, 2002; 137:347-360.

10.1 Definitions

Participation Rate: *Percentage of women who have a screening mammogram (calculated over a 30-month period) as a proportion of the eligible population (section 10.2.1)*

Retention Rate: *Estimated percentage of women who are re-screened within 30 months of their previous screen (section 10.2.2)*

Abnormal Call Rate: *Percentage of women screened referred for further testing because of abnormalities found with a program screen (section 10.2.3)*

Invasive Cancer Detection Rate: *Number of invasive cancers detected per 1,000 women screened (section 10.2.4)*

In Situ Cancer Detection Rate: *Number of ductal carcinoma in situ (DCIS) cancers (rather than invasive cancer) during a screening episode per 1,000 women screened (section 10.2.5)*

Diagnostic Interval: *Total duration from abnormal screen to resolution of abnormal screen (section 10.2.6)*

Positive Predictive Value: *Proportion of abnormal cases with completed follow-up found to have breast cancer (invasive or in situ) after diagnostic work-up (section 10.2.7)*

Benign to Malignant Open Biopsy Ratio: *Among open biopsies, the ratio of number of benign cases to the number of malignant cancer cases (section 10.2.8)*

Invasive Cancer Tumor Size: *Percentage of invasive cancers with tumor size of <10mm and < 15mm in greatest diameter as determined by the best available evidence: 1) pathological*, 2) radiological, 3) clinical (section 10.2.9)*

** (> 99.9% of tumor sizes input into NSBSP database are pathological)*

Node Negative Rate in Cases of Invasive Cancer: *Proportion of invasive cancers in which the cancer has not invaded the lymph nodes (section 10.2.10) ***

*** For Nova Scotia this figure also includes node negative cases of DCIS. Although rare, surgical pathology reports of DCIS can have positive node pathology.*

Post Screen Detected Invasive Cancer Rate: *Number of women with a diagnoses of invasive breast cancer after a normal screening within 12 and 24 months of the screen date for women screened on an annual or biennial basis respectively*

10.2 Indicators (National and Provincial)

Table 10.1 presents both the national provincial performance indicators.

10.2.1 Participation Rate

Percentage of women who have a screening mammogram (calculated over a 30-month period) as a proportion of the eligible population

Target: $\geq 70\%$ of the target population

The NSBSP participation rate for the timeframe of 2015 - 2016 was **54.59%** of the target population in Nova Scotia.

Over the past year there was a biennial participation rate change of **-1.47%**. In the same time-frame the number of screens increased by **0.5%**, compared to a **1.2%** increase one year ago. The actual number of women screen has increased from 79003 to 79430 in the past year.

Table 10.1: Performance Indicators (ages 50-69)

Indicator	Canadian Recommendations	Canada 2011-12	Nova Scotia			
			2013	2014	2015	2016
Number of screens	None	2509806	41436	41819	41671	43544
Number of 1 st screens	None	403348	1949	2484	2002	2028
Number of cancers	None	11638	216	273	271	222
Participation Rate	≥70% of the eligible population	54%	55.52%	55.38%	56.06%	54.59%
Retention Rate 1 st screen	≥75% re-screened within 30 months of the initial screen	68.8%	56.5%	53.6%	50.5%	51.9%
Re-screen	≥90% re-screened within 30 months of the subsequent screen	82.6%	86%	84.3%	83.8%	86.1%
Abnormal Screen Rate 1 st screen	< 10% of initial screens reported as abnormal	15.3%	16.3	14.8	14.7	13.7
Re-screen	< 5% of subsequent screens reported as abn	7.2%	5.4	5	5.2	5.3
Invasive Cancer Detection Rate (per 1,000 screens) 1 st screen	> 5 per 1,000 initial screens	4.9	11.29	10.87	15.48	9.37
Re-screen	> 3 per 1,000 subsequent screens	3.7	3.93	4.96	4.76	4.14
In Situ Cancer Detection Rate, (per 1,000 screens) 1 st screen	Surveillance and Monitoring Only None	1.2	3.08	2.01	1.5	0
Re-screen	None	0.8	0.86	1.07	1.01	0.75
Diagnostic Interval No tissue biopsy	≥ 90% within 5 weeks (no tissue bx)	79.1%	76.5%	78.6%	80.6%	83.9%
With tissue biopsy	≥ 90% within 7 weeks (with tissue bx)	54.9%	67.9%	62.6%	70.7%	75.9%
Positive Predictive Value (%) 1 st screen	≥ 5% for initial screens	4.1%	8.8%	8.7%	11.5%	6.8%
Re-screen	≥ 6% for subsequent screens	6.5%	8.9%	12.4%	11.7%	9.4%
Benign:Malignant Open Biopsy Ratio ¹ First Screen	≤ 1:1	2.6 : 1	0.1 : 1	0.1 : 1	0.2 : 1	0.2 : 1
Rescreen	≤1:1	1.6 : 1	0.2 : 1	0.1 : 1	0.1 : 1	0.1 : 1
Screen-Detected Invasive Cancer Size ≤ 10mm ²	> 25% invasive tumours	34.1%	33.97	42.64	36.33	37.26
> 50% invasive tumors ≤ 15mm		59.2%	63.16	64.91	62.11	60.38
Percentage of Node Negative Screen Detected Invasive Cancer (%)	> 70% of screen-detected invasive cancers	76.4%	79.5%	83.6%	81.4%	77.8%

Table 10.2: Performance Indicators under review (ages 50-69)

		Canada		Nova Scotia			
		2003+04	2013	2014	2015	2016	
Benign Open Surgical Biopsy Rate	Surveillance and monitoring						
	Initial screen	3.4	2.1	1.6	3	1.5	
	Re-screen	2.1	0.8	0.6	0.5	0.7	
B : M ratio - direct to open bx ^a	Surveillance and monitoring		1.4 : 1	1 : 1	0.8 : 1	6 : 0	
Benign core biopsy rate (per 1,000)	Surveillance and monitoring						
	Initial screen	13	49.8	31	29.5	39.4	
	re-screen	4.8	10.2	10.2	9.5	9.7	
Benign to Malignant core biopsy ratio	Surveillance and monitoring						
	Initial screen	2.9 : 1	4 : 1	2.6 : 1	2 : 1	4 : 1	
	Re-screen	1.4 : 1	2.2 : 1	1.7 : 1	1.5 : 1	1.9 : 1	

^aCaptured by the province of Nova Scotia only, to obtain a quality performance indicator for facilities in this province where breast surgery is performed

The most frequent “self-reported” reason for participation in NSBSP continues to come from recommendations for regular mammography screening by family physicians. This strongly supports the Program’s decision to focus promotional funding on increasing physician awareness of early detection by mammography screening and the associated cost benefit. Of interest as well, is the fact that the most common reason for Gynecological Screening is due to reminders by NSBSP, at the time of breast screening examinations.

In 2015, 10.5% of women screened were over age 69. This remained at 10.5% in 2016. In 1997, 4% of NSBSP’s clientele were over the age of 69. Following policy change in 1998 to accept these women into the program (but not send them reminder letters) these figures have been watched carefully for the resulting affect on program capacity, as it increasingly affects available bookings for the target age group of 50-69. However, many in this group had started with the program when in the target age group and if still asymptomatic, should not need to have examinations in and tie up the diagnostic system. **After age 70, screening mammography is recommended if a women’s life expectancy is anticipated to be ten years or more.** The NSBSP is currently reviewing its policy on reminder notices with an eye to extending this practice to women 70-74.

In the initial six months of the program the policy to not accept the 40-49s was clearly not enforced and 20% of women attending were in this age group. However, physicians and women in their 40s lobbied strongly in an effort for them to officially become part of the program. Following a relatively high cancer detection rate and a high number of node positive cases seen in this group in 1992, it was decided to change policy and accept these women in order to provide organized outcomes for this younger group for whom surveillance and monitoring should also occur. If this had not been done, they also would have continued to have screening mammography in the diagnostic mode, resulting in unnecessary appointments in the diagnostic sector, increase cost to the health care system, and no tracking of outcomes. In 1995, it officially became policy to send recall letters to these younger women using the annual screen protocol.

In 2016, 23.1% of NSBSP participants were aged 40-49.

The commitment of the Nova Scotia Department of Health & Wellness to the Nova Scotia Breast Screening Program has resulted in linear increases in participation rates. Support given by the Department of Health & Wellness toward provision of a truly comprehensive, provincial mammography program continues to be apparent. For the **two** year period of 2015 and 2016, there were 79430 (**Table 10.3**) screening mammograms performed through the NSBSP on women in the target age group.

Figure 10.1: NSBSP Biennial Participation (ages 50-69)

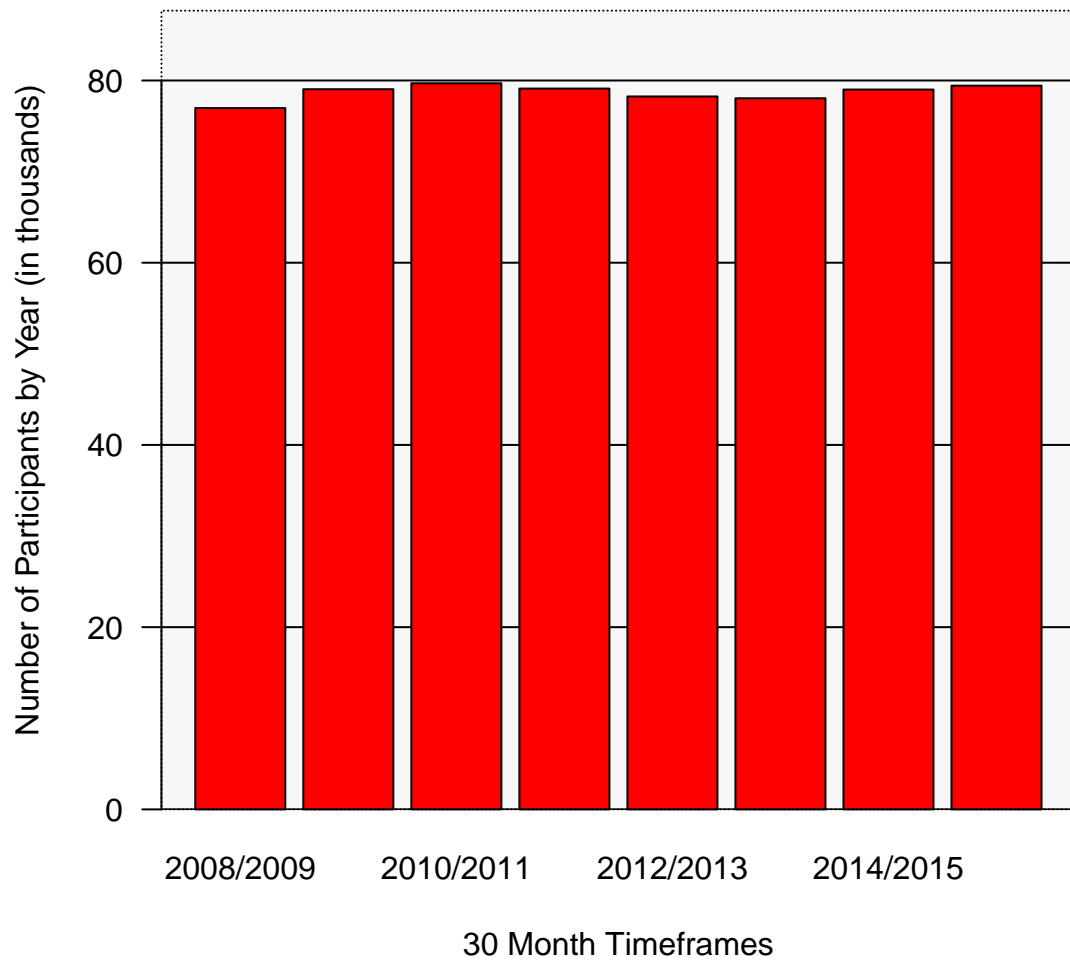


Table 10.3: NSBSP Biennial Participation Rate and Trend by Site, ages 50-69

Site	Target Population	2012+2013		2013+2014		2014+2015		2015+2016		Annual Site Participation Trend ^a	Biennial Screens 2015+2016
		Participation Rates	Participation Rates	Participation Rates	Participation Rates	Participation Rates	Participation Rates				
Unknown	-										898
1 South Shore	10409	52.3%	52.16%	54.8%	53.92%	-0.87%	5613				
2 SW Nova	9557	57.18%	54.31%	52.26%	50.08%	-2.19%	4786				
3 Annapolis Valley	13368	51.27%	49.64%	49.58%	48.12%	-1.46%	6433				
4 Colchester E. Hants	11286	51.76%	51.13%	50.96%	48.34%	-2.62%	5456				
5 Cumberland	5224	51.8%	52.18%	52.78%	52.16%	-0.62%	2725				
6 Pictou	7494	56.74%	55.45%	55.91%	55.5%	-0.41%	4159				
7 Guys/Ant	7223	55.32%	55.65%	56.1%	56.18%	0.08%	4058				
8 Cape Breton	20121	50.91%	50.8%	51.77%	50.26%	-1.51%	10112				
9 Capital	60815	59.06%	59.62%	60.12%	57.86%	-2.26%	35190				
Total	145497	55.52%	55.38%	56.06%	54.59%	-1.47%	79430				

^aThe 2013 population estimates (data modelled from Statistics Canada) places the number of woman aged 50-69 at 140923, up from 2012 estimates of 137373

Table 10.4 contains in addition to data in **Table 10.3**, diagnostic data from facilities booking diagnostic mammography using the Central Mammography Booking Database. The data presented in **Table 10.4** shows **88985** women having at least one bilateral mammogram in a two year period at either a screening or diagnostic site. The resulting mammography participation rate is **61.16%** a change of -1.56% over 2015.

Italicized numbers in column three, indicate numbers of women by site having had a bilateral diagnostic examination outside the screening program, and who have not already had a screening mammogram in the same year. The majority of Nova Scotia hospitals are effectively channelling appropriate screening cases to the program mode and six have implemented the provincial diagnostic reporting system. Breast Imaging performed in diagnostic centers must be ordered by faxed requisition or ordered proactively. “Diagnostic” bookings comprise symptomatic cases, abnormal screen work-ups, women with previous breast cancer, and short term follow-up cases following core biopsy, surgery or previous mammography. See Appendices A and B.

Figure 10.2: 2015/2016 Combined Provincial Mammography Participation Rates per Site (ages 50-69)

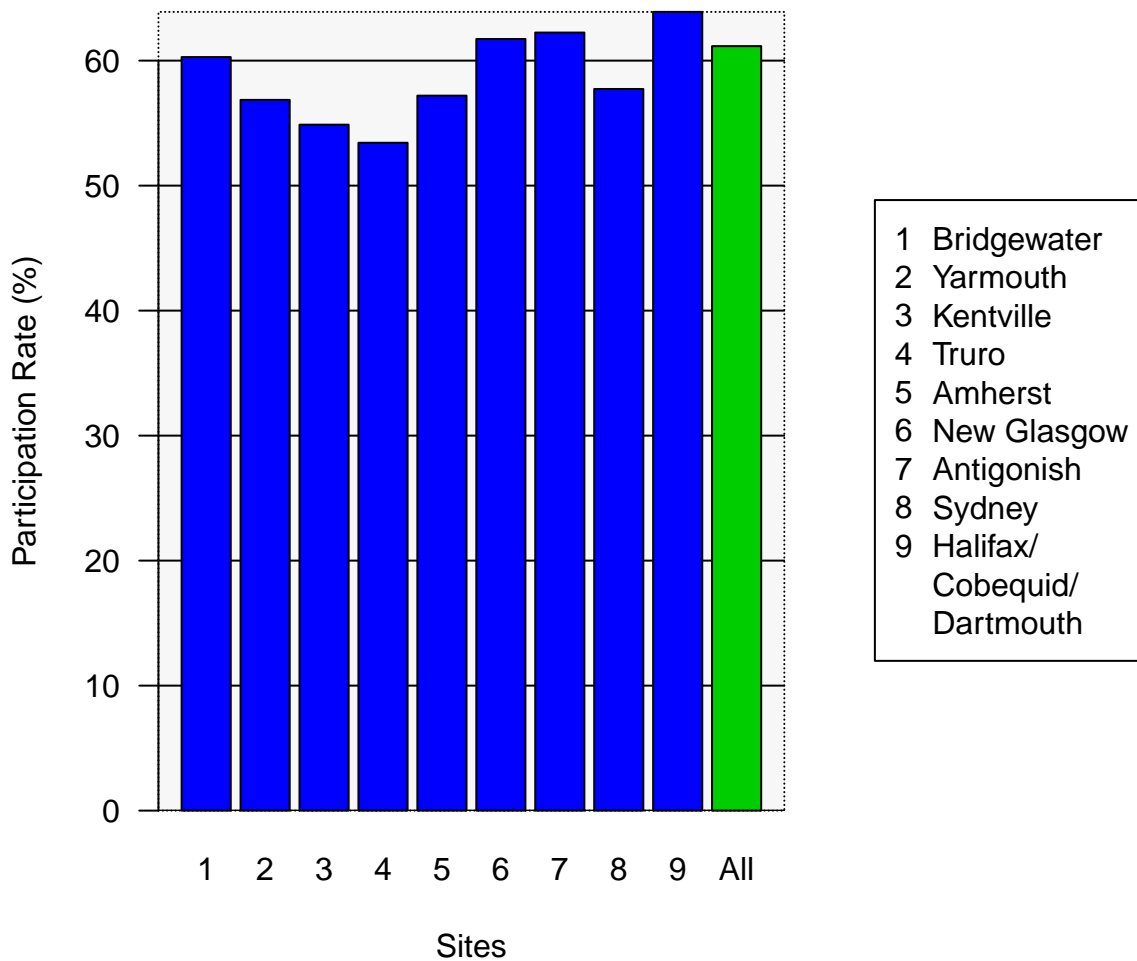


Table 10.5 has in addition to data in **Table 10.3** the cancer detection rate of surgically removed cancers

by site.

It is important to remember that the cancer rates in **Table 10.5** do not reflect the overall provincial cancer detection rates. These figures include only screen-detected cancers, which are cancers detected by screening mammography, and they represent approximately one-half of the cancers detected annually in this province.

Table 10.6 is similar to **Table 10.4** except for the addition of the ages 40 to 49. This age group (recalled on an annual basis, although not actively recruited) is accepted by NSBSP for purposes of data collection and other benefits available only through the organized program. In **Table 10.6** it can be seen the provincial **screening plus diagnostic** participation rate when including the 40-49 age group for 2016 is **57.31%** (**57.56%** one year ago). Analysis of data on women under age 50 is now possible when reporting is done through the provincial diagnostic database.

10.2.2 Retention Rate

Estimated percentage of women who are re-screened within 30 months of their previous screen

Target: *initial screen* \geq 75% *re-screened within 30 months*
 re-screen \geq 90% *re-screened within 30 months*

NSBSP Retention rates for this report are calculated on the number of eligible women that have returned to the program for a subsequent screen within 30 months of their previous screen if aged 50-69 and 18 months for ages 40-49. Women over the age of 69 are not included in this calculation as they are accepted into the program but are not sent reminders. Optimal benefits of screening are brought about by regular participation in the screening program (at least every 2 years). At present there is no indication that the benefits of screening are lost if rescreening occurs up to 6 months after the recommendation interval. *"Guidelines for monitoring Breast Screening Performance" Second Edition Aug 2007 page 8.*

Figure 10.3: Retention Rates by Year (ages 50-69)

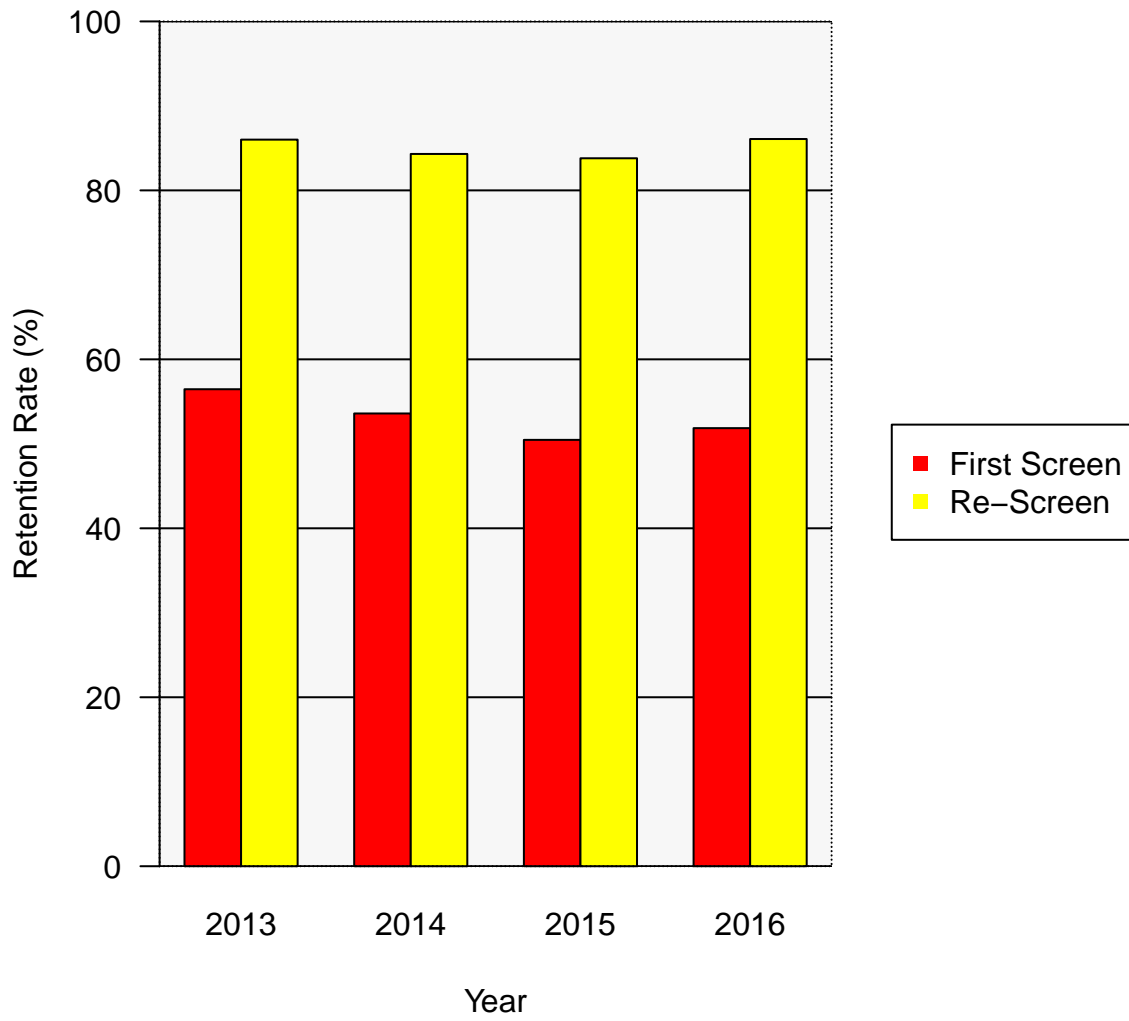


Table 10.4: Diagnostic and Screen Biennial Participation Rates ages 50-69

Diagnostic Mammography Facilities by Site	Target Population ^a	Biennial Diagnostic Mammograms 2015-2016	Biennial Screens Plus Biennial Diagnostics 2015+2016	Combined Participation Rates 2013+2014 Per Site	Combined Participation Rates 2014+2015 Per Site	Combined Participation Rates 2015+2016 Per Site
Unknown	-	426	1324			
1 South Shore Regional	10409	662	6275	57.9%	60.6%	60.3%
3 Yarmouth Regional	9557	648	5434	60.2%	58.7%	56.9%
3 Valley Regional	13368	903	7336	50%	56.6%	54.9%
4 Colchester Regional	11286	574	6030	52.2%	56.1%	53.4%
5 Cumberland Regional	5224	263	2988	56.7%	57.4%	57.2%
6 Aberdeen	7494	467	4626	61%	61.6%	61.7%
7 St. Martha's	7223	438	4496	56.5%	62.2%	62.2%
8 Cape Breton Health Care	20121	1504	11616	57.7%	58.9%	57.7%
9 QEII HSC and DGH	60815	3670	38860	65.4%	66.3%	63.9%
Total	145497	9555	88985	60.64%	62.72%	61.16%

^aThe 2013 population estimates (data modelled from Statistics Canada) places the number of women aged 50-69 at 140923, up from 2012 estimates of 138373

Table 10.5: 30-Month Participation and Cancer Detection Rate by Site ages 50-69

Site	Target Population ^a	Women Screened	Participation rate	Invasive Cancers	In situ Cancers	All Cancers	Cancer Rate per 1000 women screened
Unknown Site	-	898		2	0	2	
1 South Shore	10409	5613	53.92%	42	4	46	8.2
2 South West Nova	9557	4786	50.08%	35	3	38	7.9
3 Annapolis Valley	13368	6433	48.12%	26	4	30	4.7
4 Colchester E. Hants	11286	5456	48.34%	38	5	43	7.9
5 Cumberland	5224	2725	52.16%	20	5	25	9.2
6 Pictou County	7494	4159	55.5%	25	3	28	6.7
7 Guysborough / Antigonish	7223	4058	56.18%	16	6	22	5.4
8 Cape Breton	20121	10112	50.26%	59	12	71	7
9 Capital	60815	35190	57.86%	260	52	312	8.9
Total	145497	79430	54.59%	521	94	615	7.7

^aThe 2013 population estimates (data modelled from Statistics Canada) places the number of women aged 50-69 at 140923, up from 2012 estimates of 138373

Table 10.6: Diagnostic and Screen Biennial Participation Rates ages 40-69

Diagnostic Mammography Facilities by Site	Target Population ^a	Biennial Diagnostic Mammograms 2015-2016	Biennial Screens Plus Biennial Diagnostics 2015+2016	Combined Participation Rates 2013+2014		Combined Participation Rates 2014+2015		Combined Participation Rates 2015+2016	
				Per Site	Per Site	Per Site	Per Site	Per Site	Per Site
Unknown	-	790	1266						
1 South Shore Regional	14159	1076	7917	54.2%	55.6%	55.6%	55.9%	55.9%	55.9%
2 Yarmouth Regional	13353	1082	6945	56.4%	53.6%	53.6%	52%	52%	52%
3 Valley Regional	18487	1441	9273	54.4%	50.8%	50.8%	50.2%	50.2%	50.2%
4 Colchester Regional	16433	1127	8388	52.9%	50.7%	50.7%	51%	51%	51%
5 Cumberland Regional	7141	430	3813	53.6%	52.5%	52.5%	53.4%	53.4%	53.4%
6 Aberdeen	10463	765	5954	57.4%	56.3%	56.3%	56.9%	56.9%	56.9%
7 St. Martha's	9857	652	5692	60%	57.7%	57.7%	57.7%	57.7%	57.7%
8 Cape Breton Health Care	27380	2452	14975	55.6%	55.3%	55.3%	54.7%	54.7%	54.7%
9 QEII HSC and DGH	91494	7812	55424	61.6%	61%	61%	60.6%	60.6%	60.6%
Total	208767	17627	119647	58.43%	57.56%	57.56%	57.31%	57.31%	57.31%

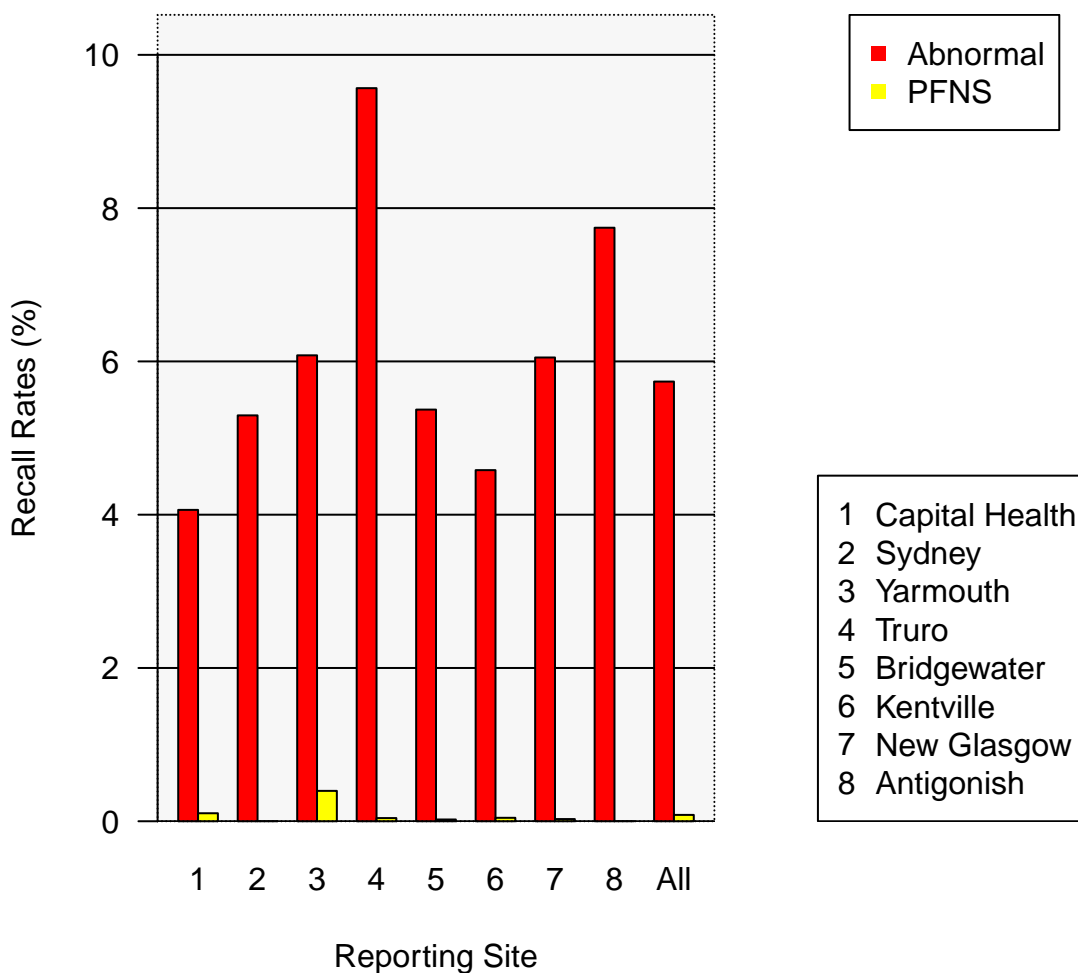
^aThe 2013 population estimates (data modelled from Statistics Canada) places the number of women aged 40-69 at 208123, up from 2012 estimates of 207909.

10.2.3 Abnormal Call Rate (%)

Percentage of women screened referred for further testing because of abnormalities found within a program screen

Targets: < 10% of 1st screens and < 5 % of re-screens

Figure 10.4: Abnormal and PFNS Recall Rates by Reporting Group 2016 (ages 50-69)



In 2016, **2498** screens in the target age group were reported as abnormal (**Table 10.7**). Abnormal reporting rates were **5.7%** overall (**13.7%** for 1st screens and **5.3%** for re-screens). An additional 36 cases (**Table 10.8**) were reported based on clinical findings categorized as Physical Findings Not Seen or “PFNS”. This compares 38 a year ago and 54 in 2014. Generally the “PFNS” reporting selection is being used, but the number of reports is minimal and not always significant enough to reflect as a percentage in **Figure 10.4**.

There were 17725 women having **20555** core biopsies (by screen exam date) through NSBSP from 1991 until 2016 (2457 women had more than one core biopsy at different times or bilaterally). Of the **1307** core

Table 10.7: 2016 Abnormal call rates and cancer detection rates (50-69)

Screens	n	Abnormal Reports	Abnormal Call Rate (%)	Cancers	Cancer detection Rate/1000 Screens
1st	2028	278	13.7	19	9.4
Re-Screen	41516	2220	5.3	203	4.9
All	43544	2498	5.7	222	5.1

Table 10.8: 2016 Physical Finding Not Seen (PFNS) call rates and cancer detection rates (50-69)

Screens	n	PFNS Reports	PFNS Call Rate (%)	Cancers	Cancer detection Rate/1000 Screens
1st	2028	2	0.1	0	0
Re-screen	41516	34	0.08	2	0.048
All	43544	36	0.08	2	0.046

biopsies performed in 2016, **226** were indicated as being done using ultrasound guidance for positioning of the needle (Table 10.10). The core biopsy program also collects core biopsy data by core biopsy date for separate studies unrelated to NSBSP annual outcomes. Additional core biopsy outcome data is shown in **Table 10.11**.

Tables 10.12 and 10.13 are included for use at the **district** level to provide a baseline for each Site and perhaps assist in reform at the district level. They include Nova Scotia Breast Screening database results only. Of importance are trends that possibly could become indicators for each district and assist in utilizing resources. NSBSP considers numbers and types of assessment tests to be helpful and relevant information for both provincial and district feedback. It is particularly useful for analyzing how health service providers apply the Clinical Practice Guidelines. These outcomes may be important at the **provincial** level to assist in providing continuous quality improvements to all services in place in both screening and diagnostic sites. It is hoped that this data may eventually be utilized to benefit women undergoing these procedures.

Table 10.9: 2016 Work-up Assessment (all ages)

Assessment Tests	All	Assessment testing per all abnormal screens	Assessment testing per all screens	1 st	Assessment testing per all abnormal screens	Assessment testing per all screens
Work-up ultrasounds	2026	48.03%	3.09%	442	58.7%	7.73%
Work-up mammograms	2823	66.93%	4.3%	495	65.74%	8.66%
Core Biopsies	1228	29.11%	1.87%	234	31.08%	4.09%
MRI	32	0.76%	0.05%	3	0.4%	0.05%
Women to surgery	403	9.55%	0.61%	43	5.71%	0.75%

Table 10.10: 2016 and Cumulative Core Biopsy Outcomes (all ages)

OUTCOME	1991-2016			2016		
	Stereo	U/S Guided	All	Stereo	U/S Guided	All
Benign	11682	1405	13087	688	140	828
Atypical/Suspicious	846	36	882	36	4	40
Cancer	4490	663	5153	287	70	357
Invasive	3271	629	3900	218	67	285
DCIS	1143	22	1165	68	2	70
Lymphoma	15	10	25	0	1	2
LCIS	61	2	63	0	0	0
Unsatisfactory	89	17	106	-2	2	0
Others ^a	1156	108	1264	72	10	82
Total	18324	2231	20555	1081	226	1307
Benign:Malignant ^b	2.6:1	2.1:1	2.5:1	2.4:1	2:1	2.3:1

^aIncludes unsuccessful and equivocal cases

^bResults of atypia and LCIS are not included to determine B : M ratios

Table 10.11: 1991-2016 Core Biopsy and Definitive Surgery Outcomes

Core Biopsy and Definitive Surgery Outcome	1991-2016	2013	2014	2015	2016
Malignant cores benign at surgery ^a	32	2	1	1	2
Malignant cores atypical or benign at surgery	26	4	2	1	2
Malignant cores malignant at surgery	4970	275	356	395	337
Malignant cores - no definitive surgery	125	5	1	3	1
Benign cores benign at surgery	800	42	54	47	50
Benign cores atypical or suspicious at surgery	123	16	8	5	6
Benign cores malignant at surgery	310	10	27	38	10
Benign cores - no definitive surgery	11854	799	709	610	737
Atypical or suspicious cores benign at surgery	151	9	6	6	7
Atypical or suspicious cores atypical or suspicious at surgery	277	14	23	12	11
Atypical or suspicious cores malignant at surgery	368	18	27	24	20
Atypical or suspicious cores - no definitive surgery	86	9	5	3	2
Unsatisfactory or others	1370	87	74	99	82

^a Of the 32 cases (31 patients - one with two cores) that were malignant on core and benign on surgery

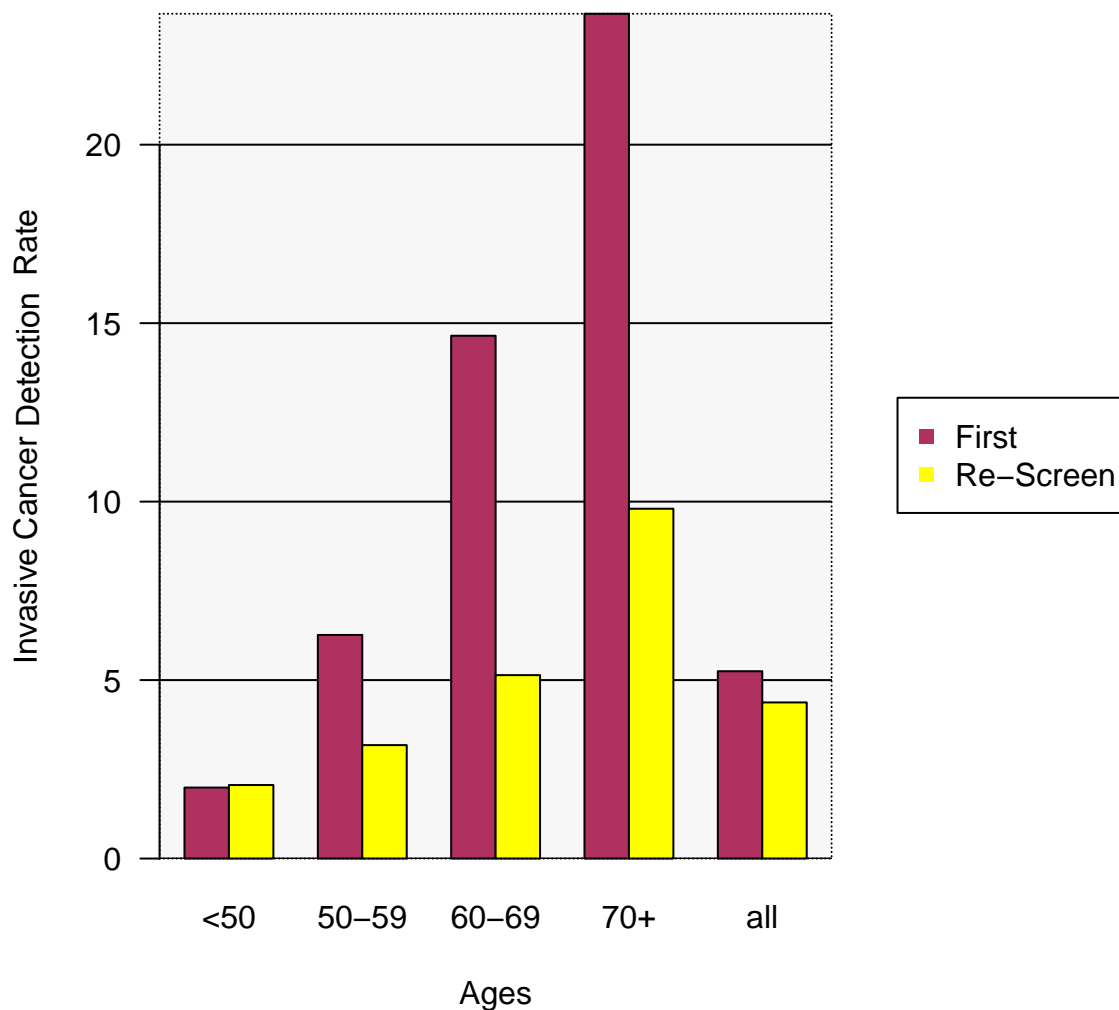
- 2 had chemotherapy prior to surgery
- 8 were invasive on core but benign on surgery
- 19 were DCIS on core but benign on surgery
- 2 were LCIS on core that went on to be benign on surgery

10.2.4 Invasive Cancer Detection Rate

Number of women detected with invasive cancers during a screen episode per 1,000 women screened

Target: 1st screen > 5 per 1000 screens Re-screen > 3 per 1000 screens

Figure 10.5: Invasive Cancer Detection Rates per 1000 Screens 2016 (by age)



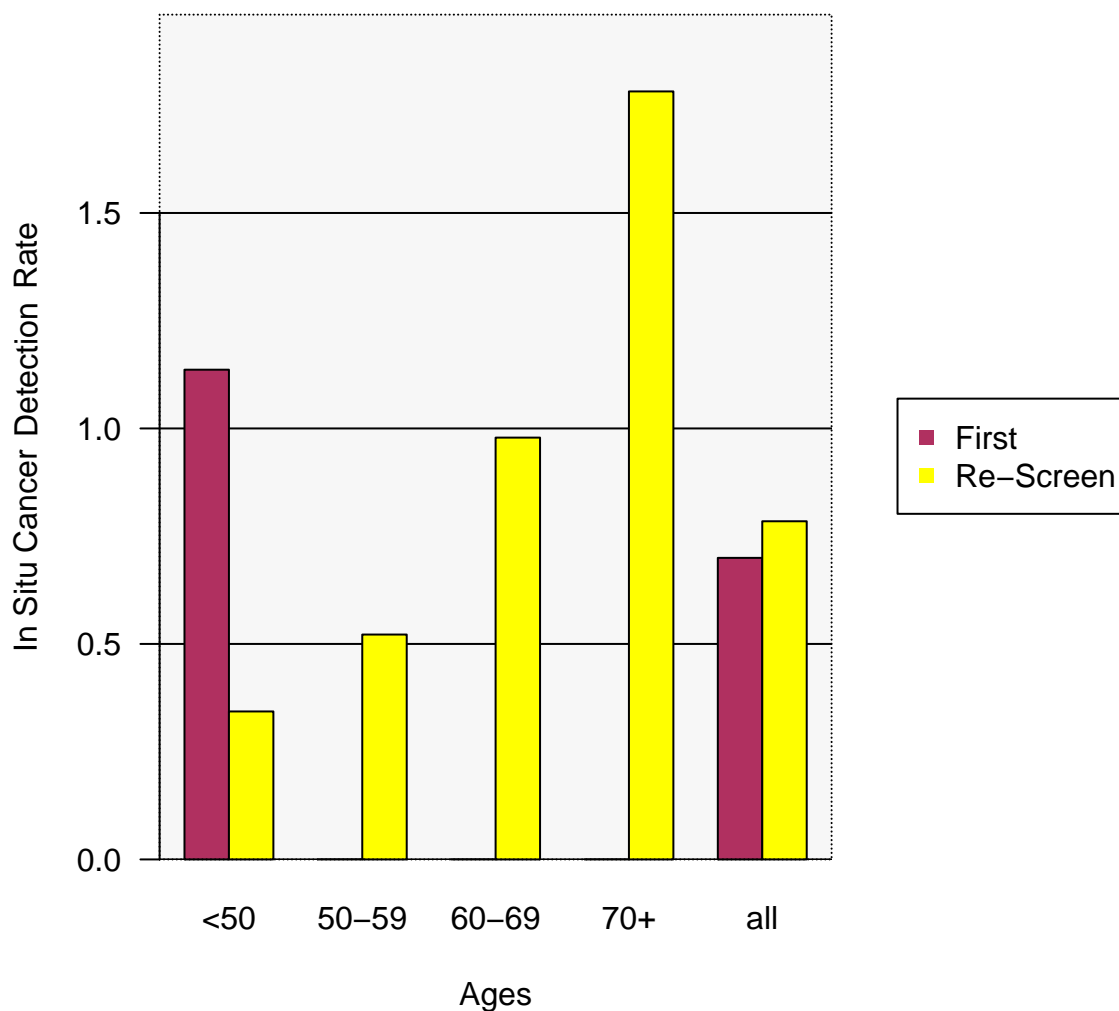
There were 292 cases of invasive breast cancer detected in 2016. Shown in ten year age groups above, 191, (65)% of these were in the 50-69 age group for a cancer detection rate overall of **4.5 per 1,000 screens**. Nova Scotia is higher than national targets of more than 5 per 1,000 (**9.4**) for first screens and 3 per 1,000 for re-screens (**4.1**). NS has seen an increase in the invasive cancer detection rate since the completion of the roll out of full field digital (FFD) mammography throughout the province in 2010. The rate of invasive breast cancer increases by age group for both initial screens and re-screens.

10.2.5 In Situ Detection Rate

Number of women detected with ductal carcinoma in situ (DCIS) cancer, rather than invasive cancer, during a screening episode per 1,000 women screened

Target: At present collected for surveillance and monitoring purposes only

Figure 10.6: In Situ Cancer Detection Rate per 1000 Screens 2016 (by age)



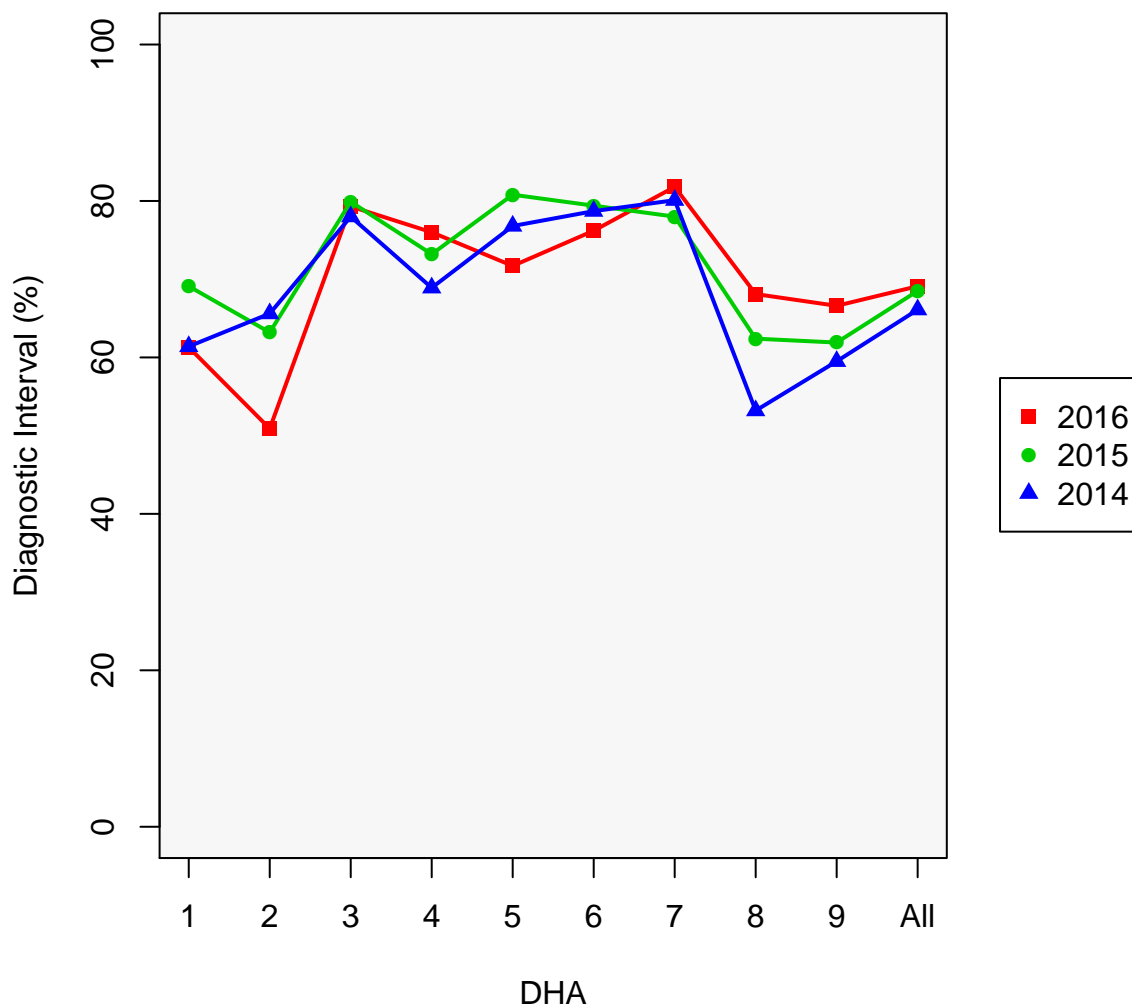
There were 51 cases of In Situ cancer detected in 2016. Of these, 31, (61%) were aged 50-69. The overall in situ cancer detection rate for this age group was **0.8 per 1,000 screens** similar to the 1% rate at the national level. The Performance Indicator's Working Group felt it inappropriate to set targets for DCIS due to lack of evidence of the transition of DCIS to invasive cancer and increasing sensitivities of screening techniques.

10.2.6 Diagnostic Interval

Total duration from abnormal screen to resolution of abnormal screen

Target: (1) > 90% within 5 weeks if no tissue biopsy
(2) > 90% within 7 weeks if tissue biopsy

Figure 10.7: Abnormal Screen to Diagnosis - no biopsy (all ages)

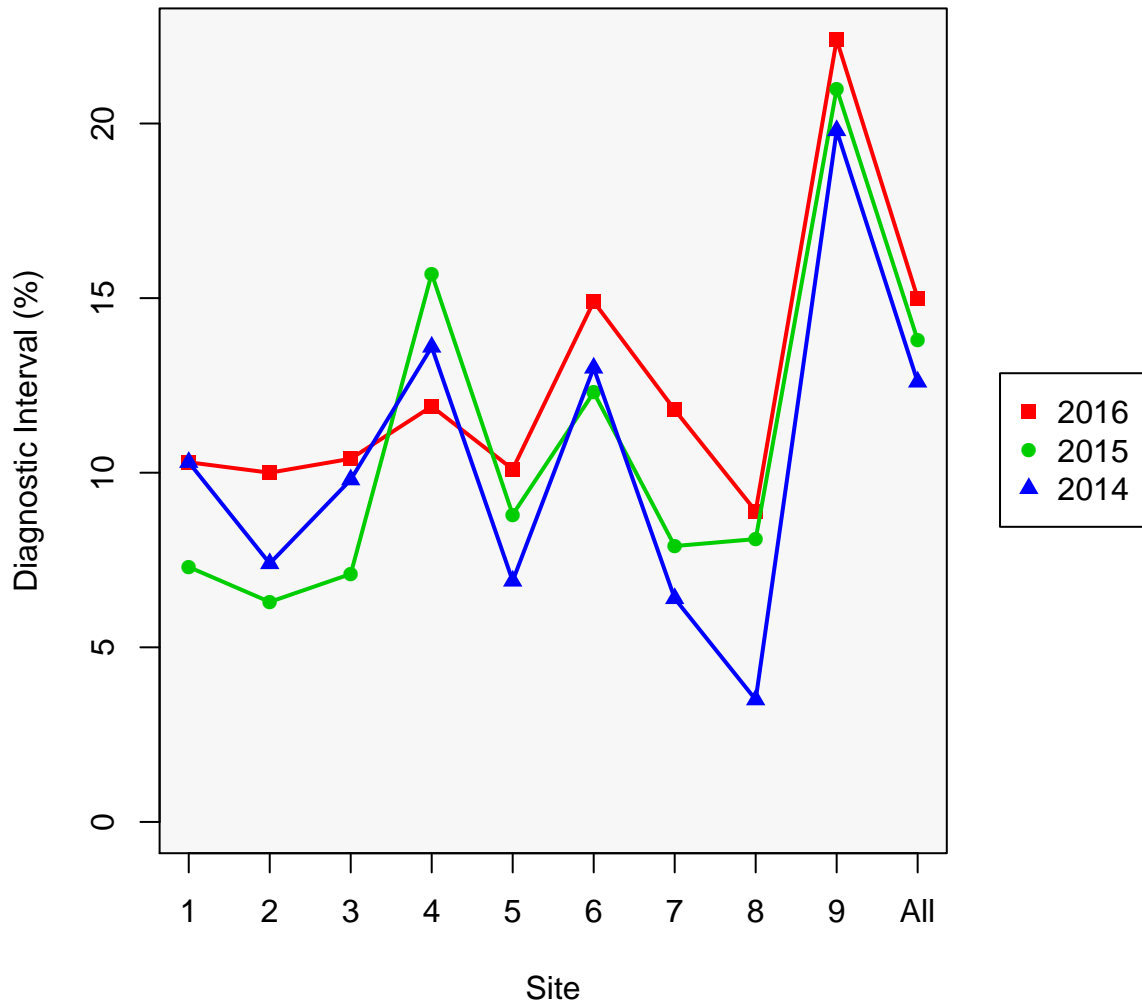


In 2016, the NSBSP overall (i.e., for all age-groups) “**Diagnostic Interval**” shows **69.1%** of abnormal screens having had **no** tissue biopsy, are at case completion after five weeks from screening. This is lower than the 75% overall nationally in 2005 and 2006. (Table 10.1).

In 2016 the overall (i.e., for all age-groups) Diagnostic Interval for women having had a tissue biopsy was 15%

Figures 10.8 and 10.7 demonstrate the diagnostic interval from abnormal screen to diagnosis with and without biopsy. Numbers of surgeries for which results were based are in **Table 10.12** and are for screening cases only.

Figure 10.8: Abnormal Screen to Diagnosis - with biopsy (all ages)



10.2.7 Positive Predictive Value

Proportion of abnormal cases with completed follow-up found to have breast cancer (invasive or in situ) after diagnostic work-up

Target: 1st screens > 5% of abnormal screens are cancer
 Re-screen > 6% of abnormal screens are cancer

Figure 10.9: High-Low Positive Predictive Values (ages 50-69)

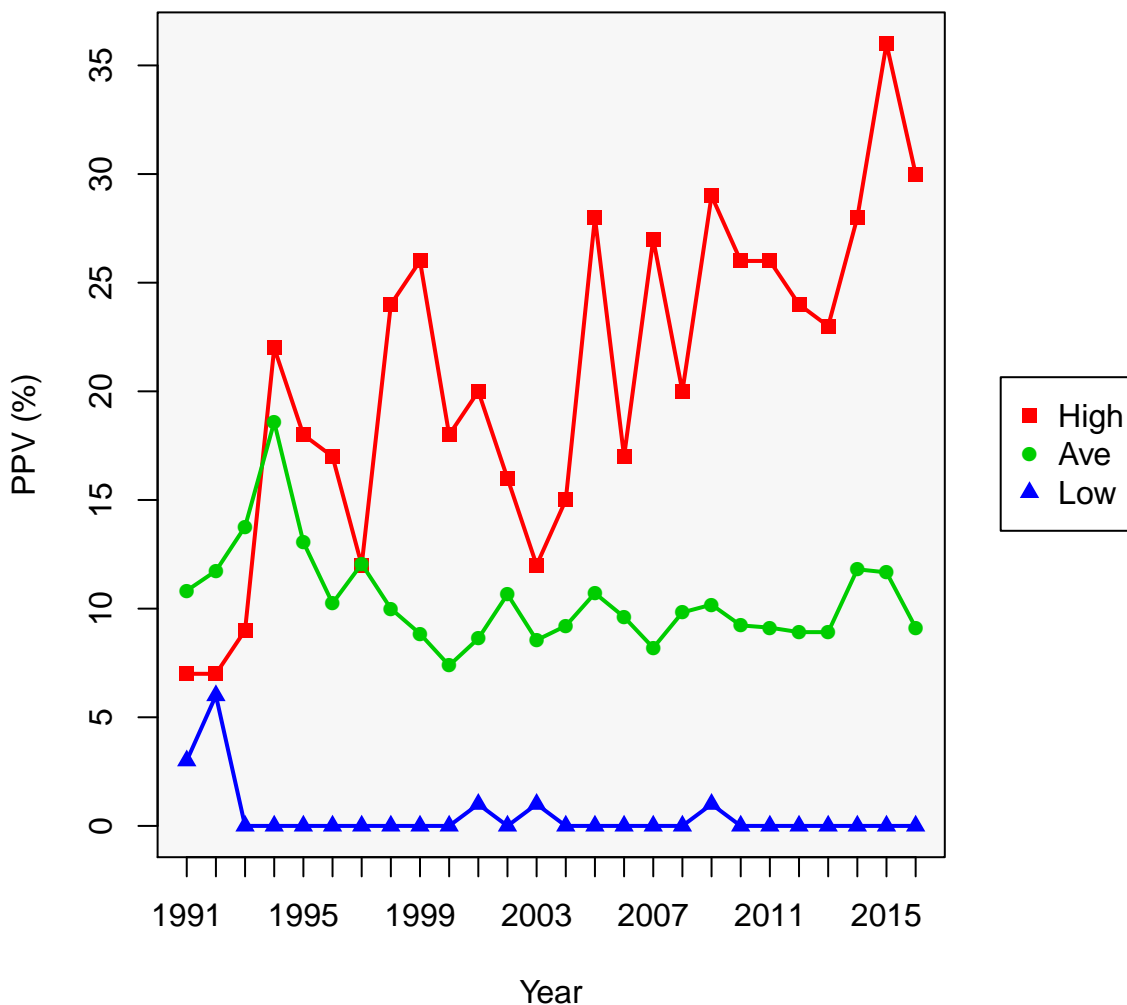


Figure 10.9 demonstrates for the target age group, the individual highest and lowest as well as the average PPV for the indicated years.

As expected, PPV's are lower for the age 40-49 group where breast density is at times greater and can decrease the sensitivity of early detection (**Figure 10.10**). Initial results of FFDM are showing it to be very beneficial in this age group.

One international publication has stated that Positive Predictive Values (PPVs) for initial mammograms were as high as 37.5% in the Netherlands where corresponding recall was 1.4%, and as low as 5% in the United States where the corresponding recall was 15%. Cancer detection rates did not closely follow the pattern of recall rates. These differences may be influenced by factors including prevalence of cancer in the screening population, radiologist training, quality of the mammograms and fear of malpractice and legal outcomes. *Report from the International Breast Cancer Screening Network (IBSN), Draft Paper 24 September 2003.*

Since the beginning of the program, all participating radiologists have received a letter detailing their individual PPV, abnormal rate and cancer detection rate for both first and subsequent screens. Specialist radiologists detect more cancers, more early stage cancers, recommend less biopsies, and have lower recall rates than general radiologists. *Performance Parameters for Screening and Diagnostic Mammography: Specialists and General Radiologists; Edward A Sickles MD, Dulcy E. Wolverton MD, and Katherine E Dee MD; RSNA, 2002.*

In 2016, the NSBSP developed a “radiologist feedback module” within the breast imaging information system that allows screening radiologists to obtain feedback on procedures they have reported. This module contains multiple filters that a radiologist can select to allow them to begin their review at various stages; all screens, abnormal screens, core biopsy, interval cancer. A radiologist can only review their own cases. Once a procedure is selected the radiologist must review all procedures that were generated as a result of their abnormal report and the recommendations. After all reports pertaining to that case have been reviewed there is a confirmation box that the radiologist must check confirming the review of that case is complete. This allows the review to be used toward CME credits (Section 3). A yearly certificate will be electronically generated for radiologists reflecting the number of cases reviewed.

The abnormal call rate continues to increase both provincially and nationally; this increases the perceived “harms” of screening. It is the hopes of the NSBSP that this feedback module will allow radiologists to review cases in an ongoing manner and through this process reduce what is considered abnormal. The radiologists do see their personal abnormal call rate for the selected time period as well as the national target in the review.

Figure 10.10: High-Low Positive Predictive Values (ages 40-49)

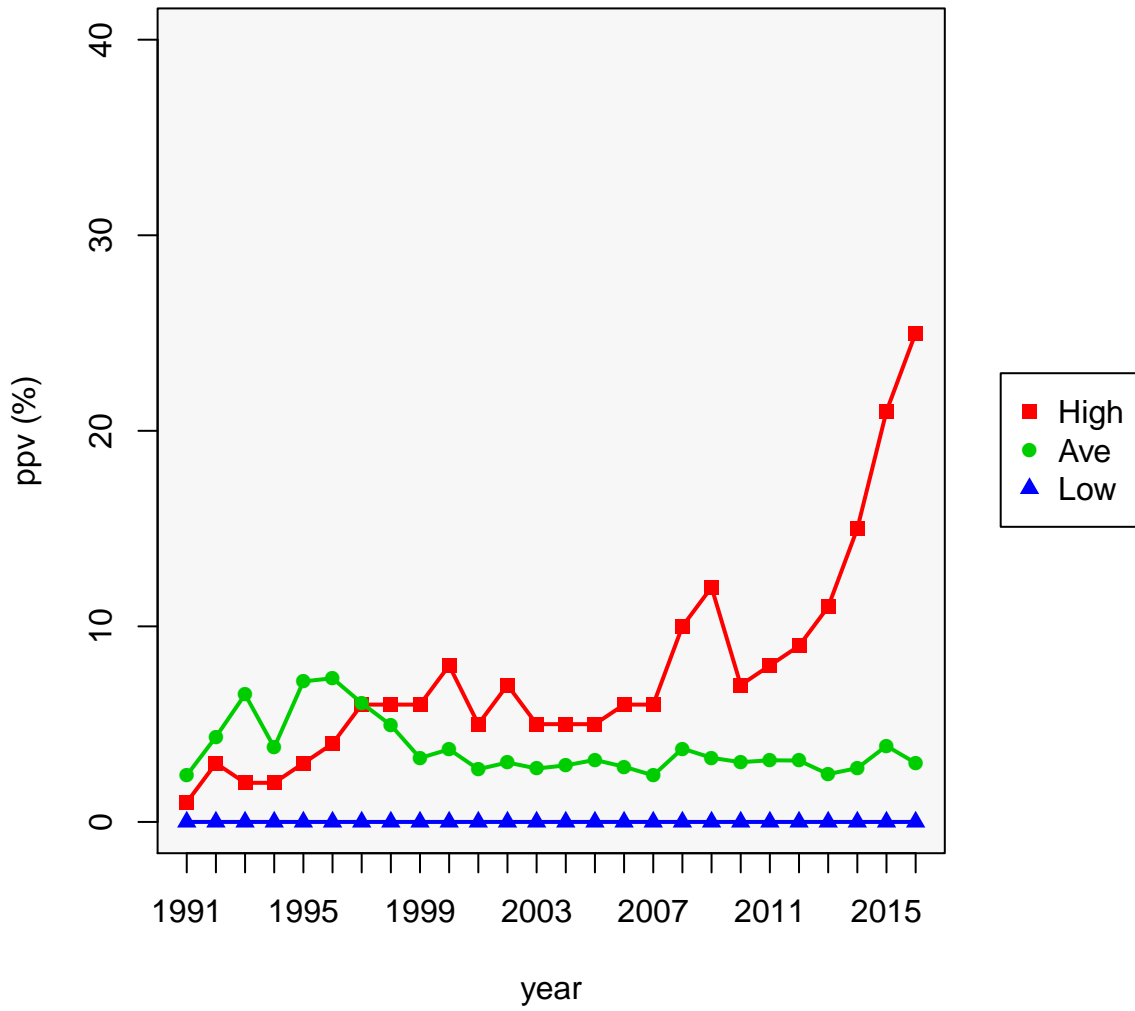


Table 10.12: 2016 NSBSP Surgical Outcomes by Site (all ages)

Site	1	2	3	4	5	6	7	8	9	Unkn	All
Screening Exams	4439	3721	4838	4582	2254	3176	3387	7789	30488	935	65617
Surgical Procedures	47	27	22	35	21	24	22	41	215	6	460
Women to Surgery	38	24	21	32	16	19	19	39	189	6	403
B : M Ratio	1:3.5	1:6.7	1:20	1:6.5	1:14	1:8.5	1:17	1:6.8	1:6.9	1:2	1:6.9
Cancer Det Rate	6.3	5.4	4.1	5.7	6.2	5.4	5	4.4	5.2	4.3	5.2

Table 10.13: 2016 NSBSP: Days to Diagnosis and Surgery Wait Times by Site (all ages)

DHA	1	2	3	4	5	6	7	8	9	Unkn	All
Screen to first core biopsy(benign)	48	65	43	46	47	29	33	47	31	38	40
Screen to first core biopsy(cancer)	30	56	32	34	49	25	24	42	28	39	32
Cancer core to first surgery	72	80	76	73	106	73	80	86	68	114	75
Benign core to first surgery	132	167	94	120	0	72	0	132	118	88	122
First core to first surgery (if multiple cores)	51	51	44	44	57	48	57	51	48	73	49
No core to first surgery	65	55	0	0	0	0	0	104	10	87	63

10.2.8 Benign to Malignant Open Biopsy Ratio

Among open biopsies, the ratio of the number of benign cases to the number of malignant cancer cases

Target: < 2:1 for all open biopsies

Figure 10.11: Benign to Malignant Open Biopsy Ratio by Site 2016 (ages 50-69)

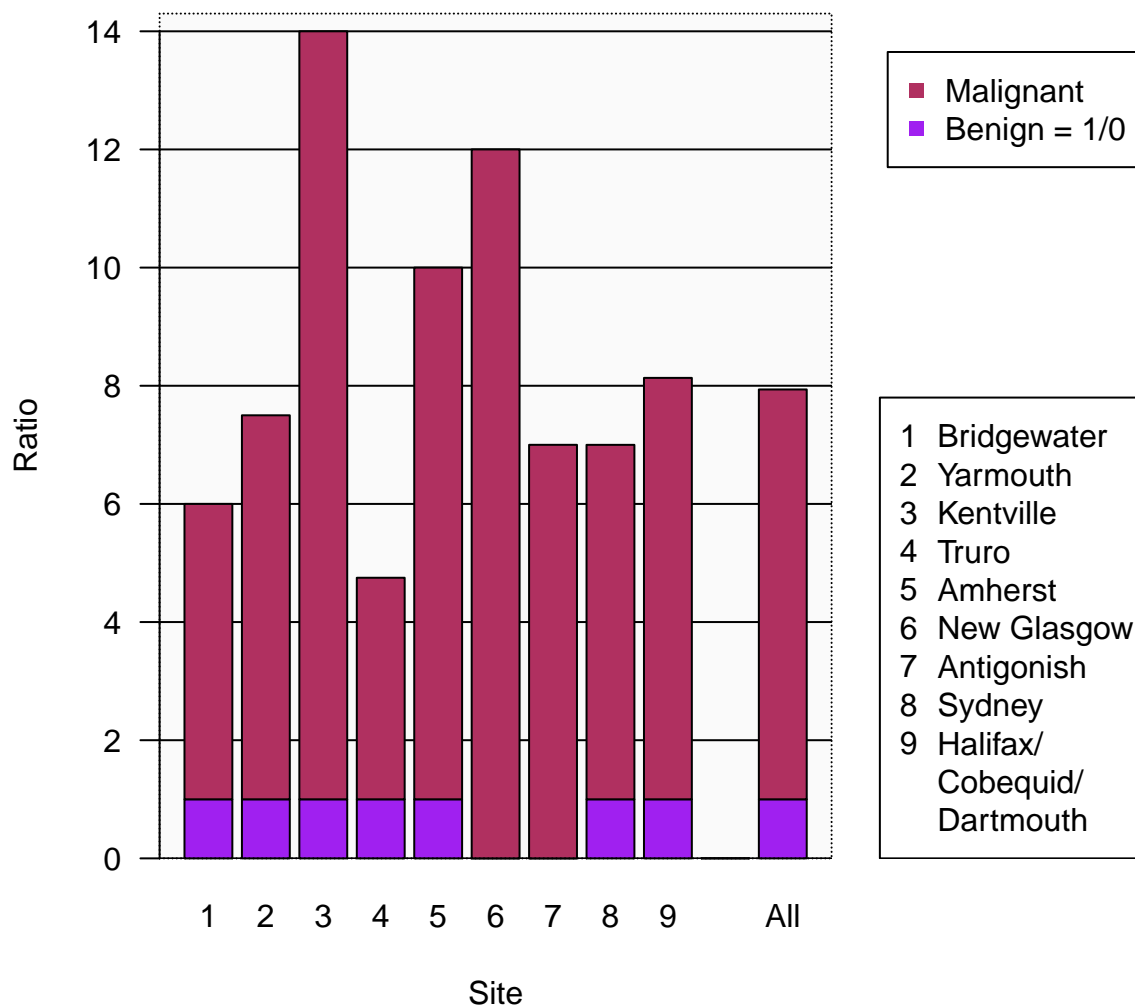
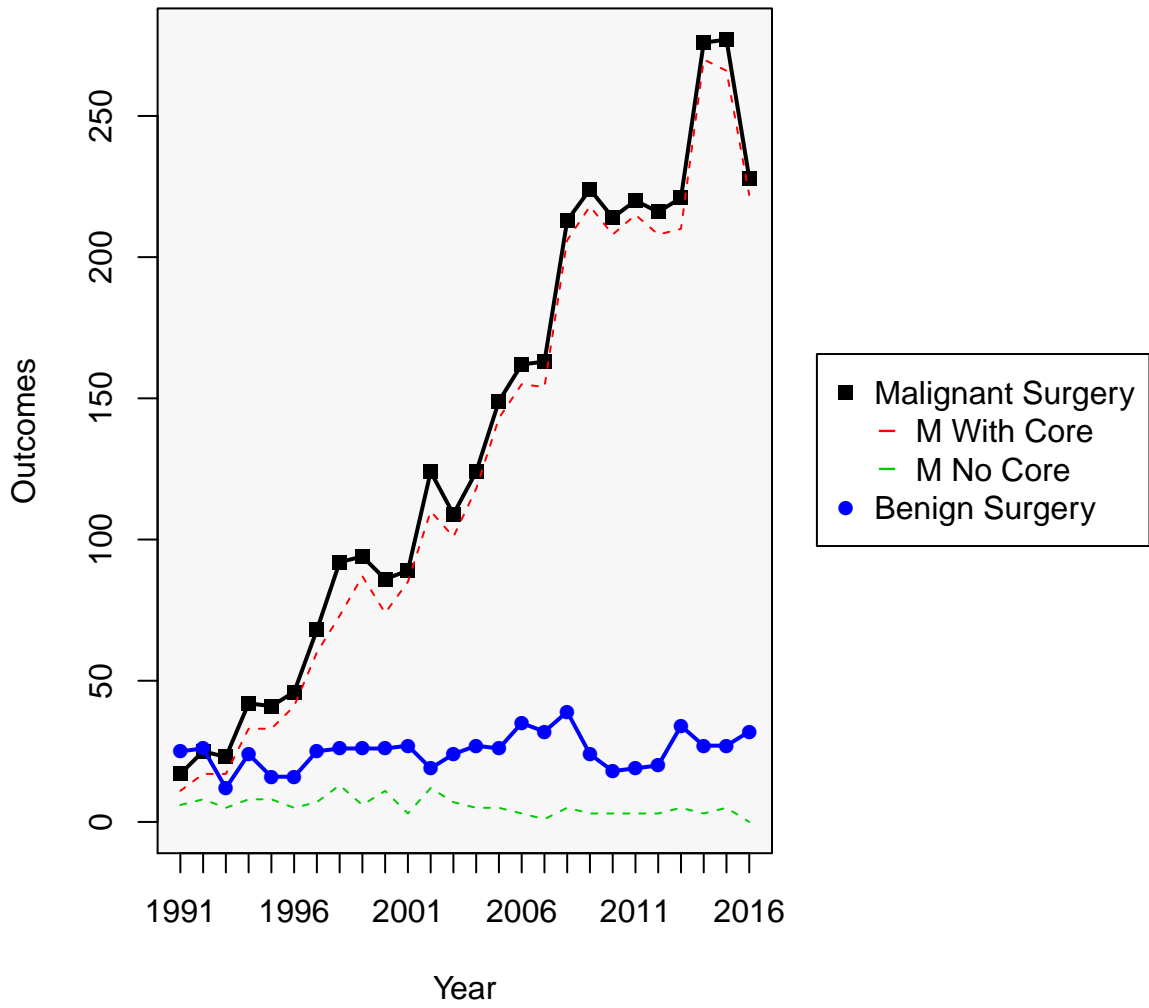


Figure 10.11 and table 10.14 demonstrate the 2016 benign to malignant surgical ratios **1 : 6.9** (or 0.1 : 1) for women aged 50-69, indicating that overall for every one benign surgical outcome, there were 6.9 malignant outcomes. The important outcome is to find the greatest number of small cancers with minimum work-up, decreased wait times and decreased number of surgeries.

The relationship between the number of benign surgical outcomes and number of malignant surgical outcomes not having had a core biopsy as part of their work-up remains similar from the beginning of the program. It is also apparent in **figure 10.12** that the number of malignant surgical outcomes has increased substantially over the years as the program has grown. It can be seen that the number of cancers subsequently

detected after having a core biopsy, remains in proportion to total number of cancers detected from open surgical outcomes. One benign or malignant surgical outcome per woman is used in **Figure 10.12** indicating that benign : malignant outcome ratios of surgery have improved greatly since the start of the program. The number of core biopsies has increased, particularly as new sites joined the organized screening see table 5.1.

Figure 10.12: Malignant (M) : Benign (B) Surgical Outcomes by Year (ages 50-69)



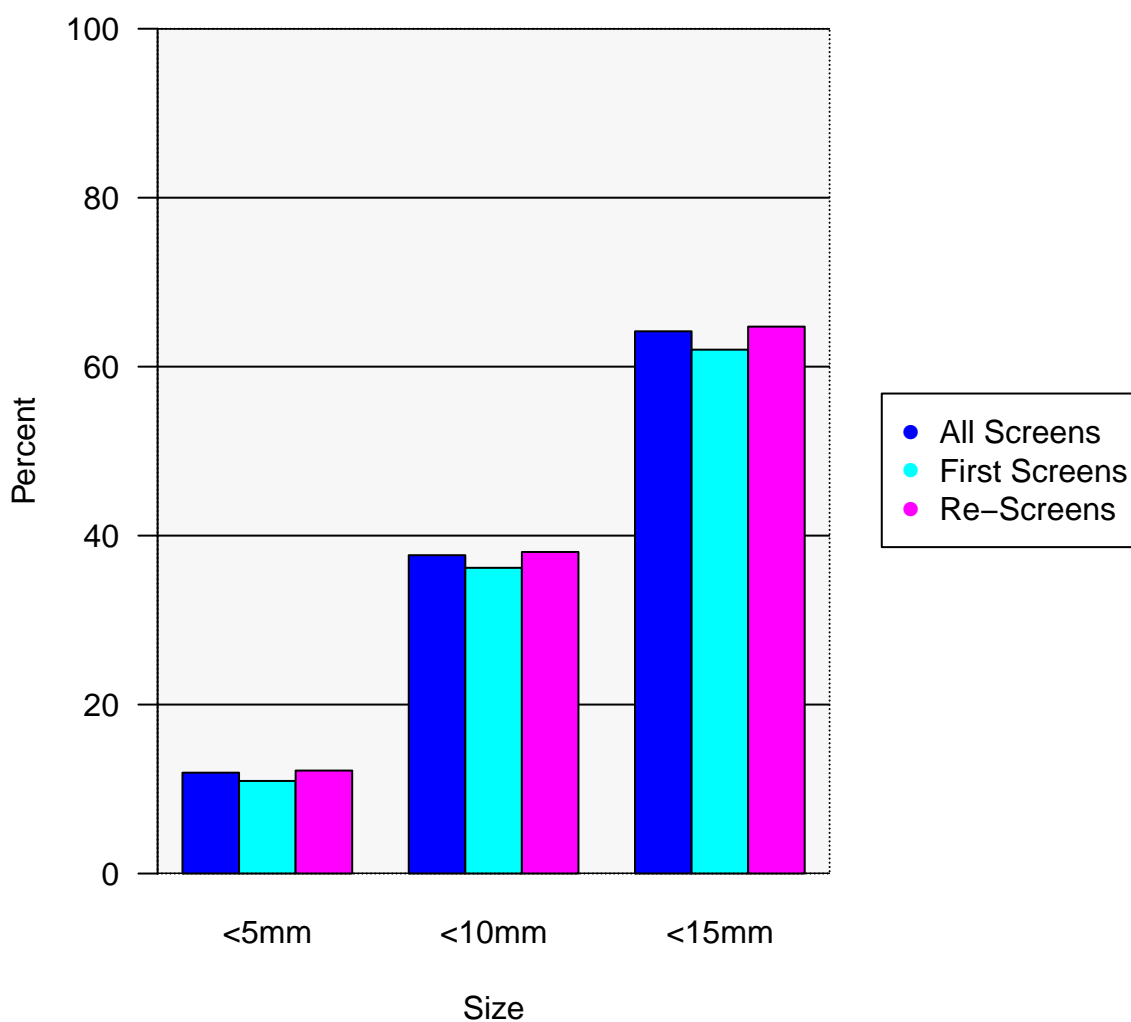
10.2.9 Invasive Cancer Tumor Size

Percentage of invasive cancers with tumor size of < 10mm and < 15mm and in greatest diameter as determined by the best available evidence

Targets: > 25% <10mm and > 50% <15mm

Of 5284 cancers of all ages detected from the start of the program, 4216 (79.8%) were invasive and of these, **11.9%** were less than or equal to 5mm, **37.7%** were 10mm or less and **64.2%** were 15 mm or less (Figure 10.13). Of all invasive cancers in the target age group, 73% were stage 1 or better.

Figure 10.13: Invasive Cancer Tumor Size 1991-2016 (all ages)

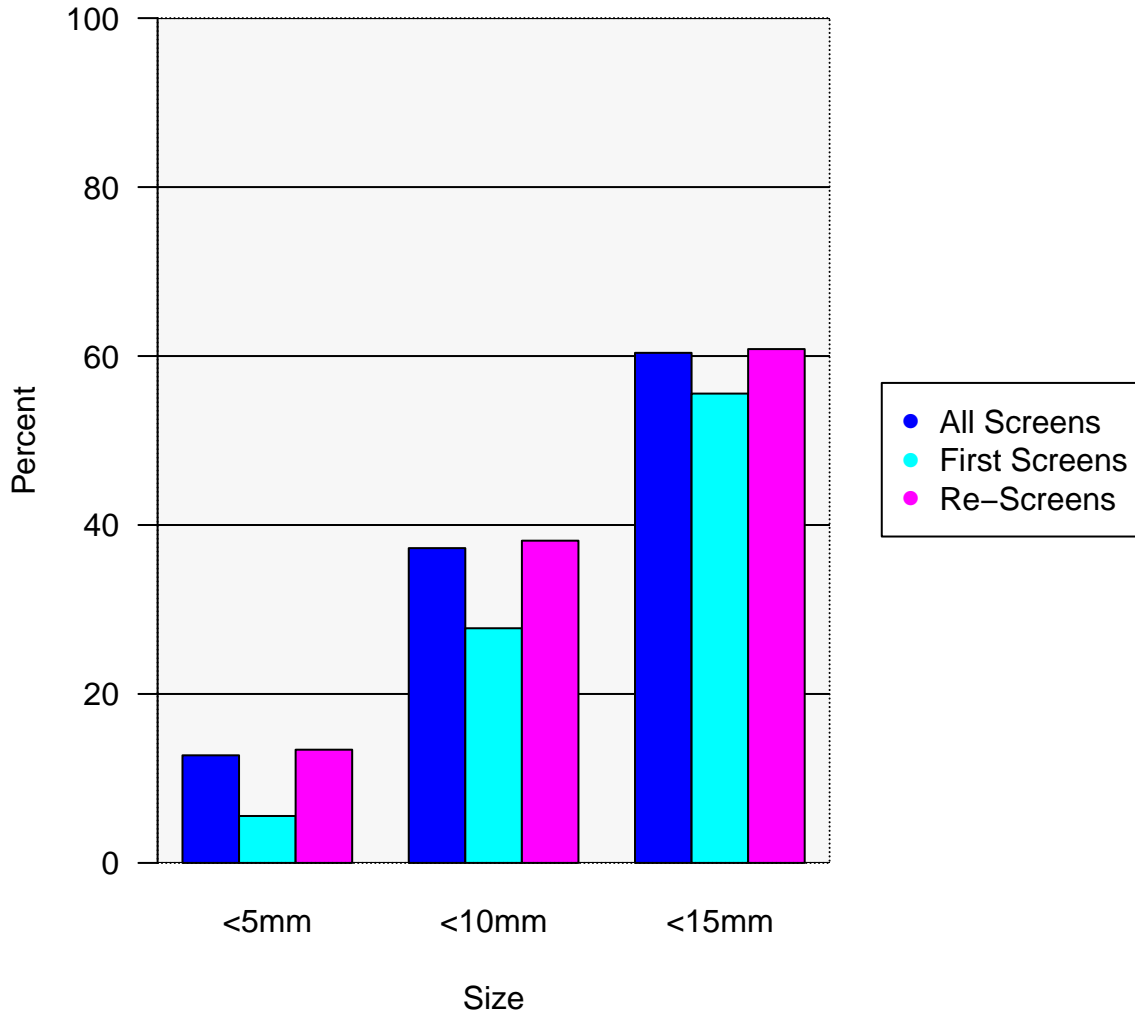


During this time 1165 cases of DCIS and 63 cases of LCIS were also detected. Over 99.5% of tumor sizes were obtained from pathology reports, with film measurements needed only in cases where it was not specified in the pathology reports.

In 2016, in the target age group, 222 cancers were detected. Of these, 191 (86% were invasive and of

these, (12.7%) were 5mm or less, 37.3% were 10mm or less and 60.4% were 15mm or less (Figure 10.14. 62% were stage 1 or better.

Figure 10.14: Invasive Cancer Tumor Size 2016 (ages 50-69)



During this time, 70 cases of DCIS were detected and there were 0 cases diagnosed as LCIS.

10.2.10 Node Negative Cancers

Proportion of invasive cancers in which the cancer has not invaded the lymph nodes

Target: > 70% node negative

Since the beginning of the program 22% of all invasive cancers in the target age group were node negative (see figures 10.15 and 10.16).

In addition there have been 198 cases of DCIS with nodal excisions (194 with negative nodes and 4 with

positive nodes). In 2016, there were 191 invasive cancers in the **target age** group of which 186 (97%) had lymph nodes excised. Of these **66%** were node negative. In all age groups there were 295 lymph node dissections and of these, 12%, 26%, 40% and 22% were in the 40-49, 50-59, 60-69 and 70+ age groups respectively.

Figure 10.15: Node Negative Cases by Year (ages 50-69)

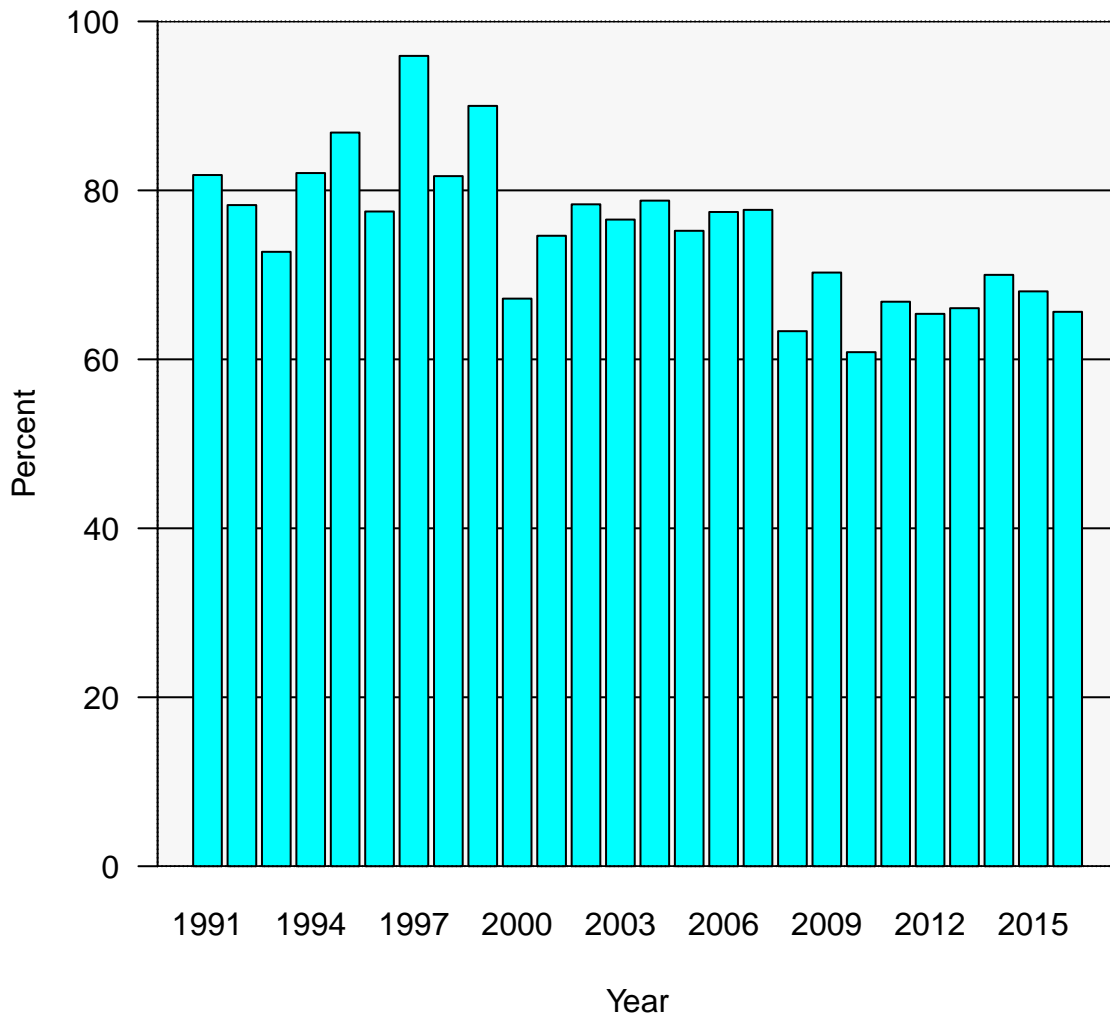


Figure 10.16: Node Negative Cases by Year (and by age)

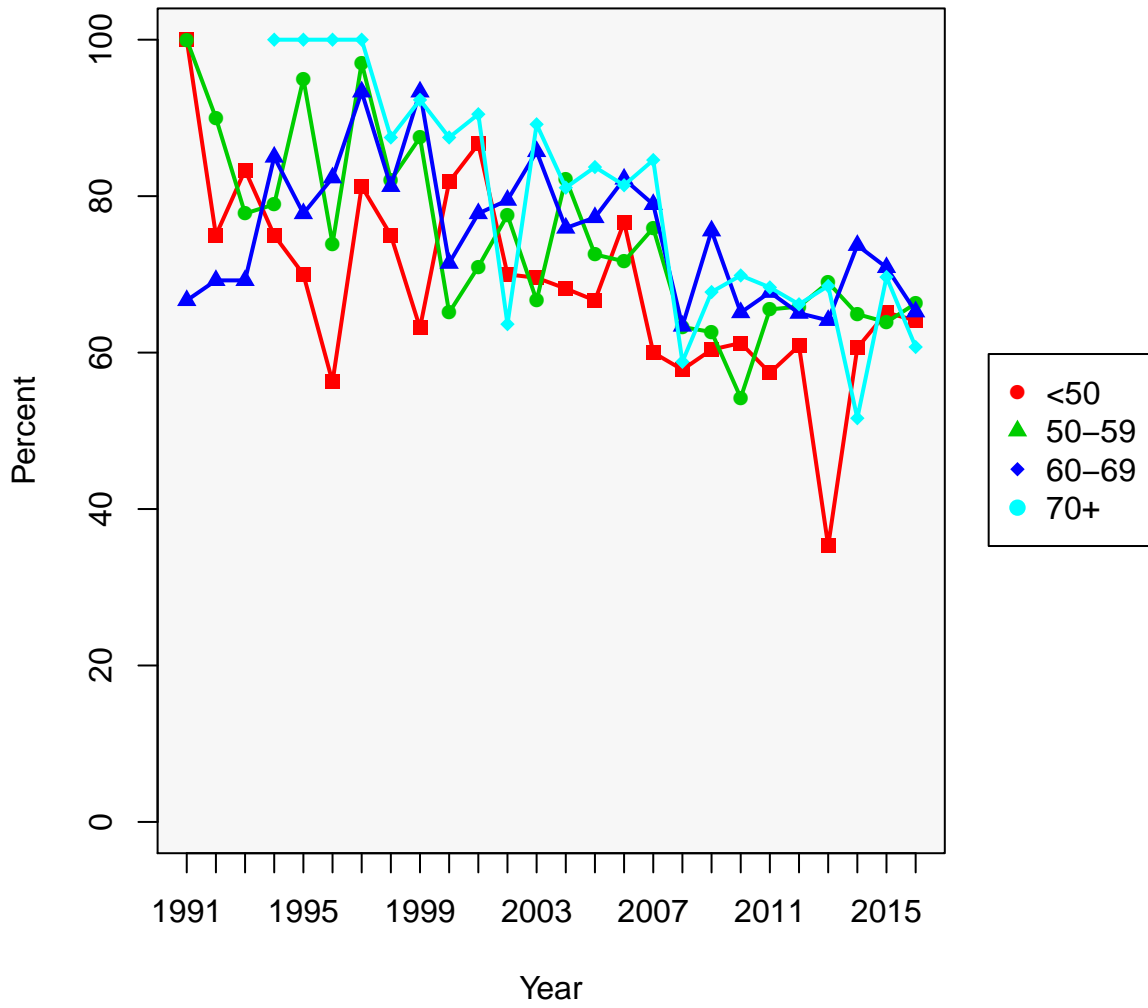


Table 10.14: 2016 Biopsy Results per woman (ages 50-69)

	B n=	M n=	Ratio	Rate
Benign : Malignant open biopsy ratio	32	222	0.14 : 1	
Benign : Malignant core biopsy ratio (atypical not included)	483	229	2.11 : 1	
Benign : Malignant core biopsy ratio (atypical included)	505	229	2.21 : 1	
Benign : Malignant core biopsy ratio (atypical and others included)	548	229	2.39 : 1	
Benign : Malignant open biopsy ratio - direct to open biopsy (no core)	6	0	Inf : 1	
Benign : Malignant open biopsy ratio - after core biopsy	26	222	0.12 : 1	
Benign open biopsy rate per 1000 screens	32			0.7
Benign core biopsy rate per 1000 screens	483			11.1

11 Former Initiatives

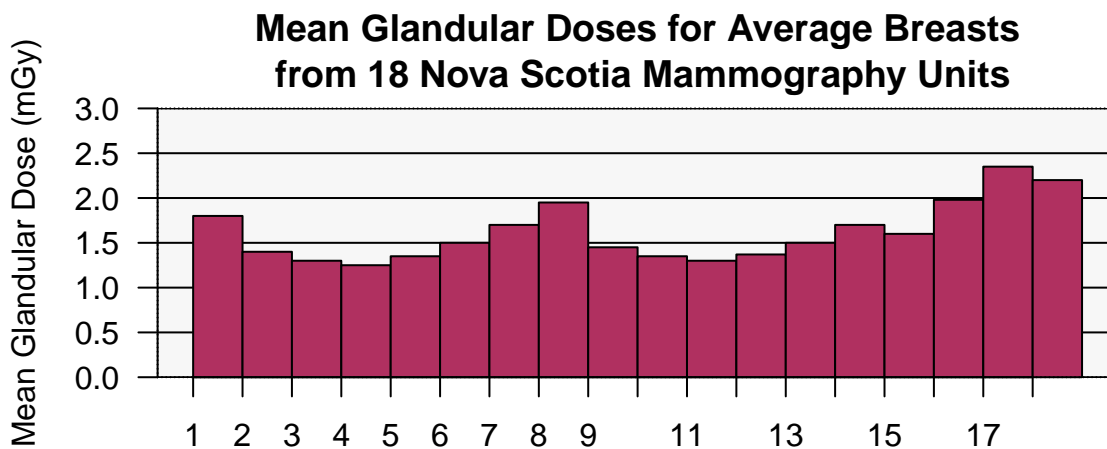
11.1 Comparing Radiation Doses in Mammography Units Across NS

The process of replacing the mammography units with digital technology in the province started in 2007. One benefit of this strategy has been a reduction of about 37% in the radiation levels which our clients receive. In a recent study performed by Drs. Eva Barkova and Cupido Daniels, the radiation levels for average breast sizes and tissue composition, which clients received in 2006 (pre-digital era) were compared to that of 2008-2009 during which 9 digital units have already been deployed.

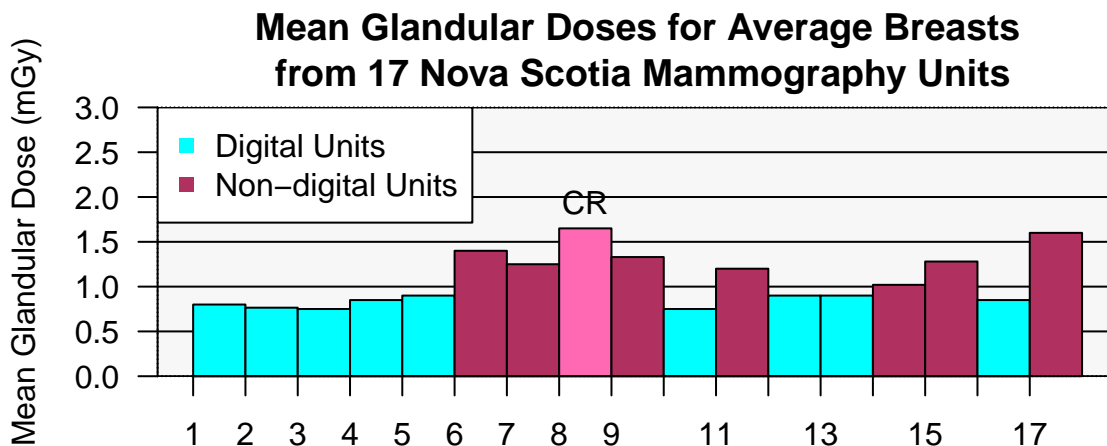
The graphs in figure 11.1 compare the distribution of radiation levels in 2006 for 18 non-digital, film-screen units and for 17 units in 2008-2009 consisting of 9 digital units, 1 computed radiography unit (CR), and 7 non-digital units. Important observations include:

1. The radiation levels for non-digital units are very varied and women are exposed to different levels of radiation, albeit all below the maximum allowable amount, depending on where the imaging occurs
2. The radiation levels for digital units are much lower (by 37%) than that of non-digital units.
3. The radiation levels for digital units are very consistent from site to site.

Figure 11.1: Radiation doses for film and digital screening systems



Mammography Units in Nova Scotia
(2006: All non-digital units)



Mammography Units in Nova Scotia
(2008–2009)

11.2 Understanding Service Delivery through the use of GIS

The NSBSP has worked with the Public Health Agency of Canada as well as two students at the Centre for Geographic Sciences (NSCC) to explore the use of Geographic Information Systems (GIS) in understanding use of breast screening services by women across NS as well as to understand how services are being delivered. The province-wide transition to Full-Field Digital Mammography (FFDM) was completed in May 2010 for all 11 fixed sites and 1 mobile unit. Nova Scotia also remains the only province to encompass all breast imaging in the province under the umbrella of an organized program.

It is within this context that a historical analysis of the use of services in the 5 years preceding the beginning of the FFDM implementation was undertaken. It was then natural that GIS be used as part of this analysis. Ms. Stephanie Lea, an x-ray technologist by background, analysed these data to form her thesis work in the Master's of Applied Health Services Research at Dalhousie University. She examined trends in participation and retention by site and over time. She also analysed where women accessed screening services in relation to where they lived. The final piece was to analyse how DHAs vary in their screening service delivery, including variations in capacity as well as the use of mobile versus fixed site service provision.

Participation results varied over time and place but were hard to interpret because of the addition of fixed sites over time. Retention results revealed an overall reduction over time and a greater range across DHAs over time, believed to be due in large part to increasing wait times that made it difficult for women to return to screening in the appropriate time interval. Interestingly, one of the features of Central Booking is that women are free to choose where to have their screening exam performed, but these analyses revealed that most women choose to be screened in their home DHA. The number of screens performed each year has been increasing across the province as a whole and in most DHAs but the number of screens performed for women aged 50-69 as a function of the number of women that age resident in that DHA (i.e., screens per capita) varied substantially over time within DHA and across DHA (Figure 11.2 contains most recent data for women aged 40+). Similarly there was wide variation in the provision of services through fixed vs mobile site over time within DHA and across DHA. This analysis has helped provide a solid foundation for comparison with the post-FFDM data and has produced a new way of thinking about how to analyse service provision across the DHAs, a methodology which over time will be incorporated into the NSBSP Annual Report.

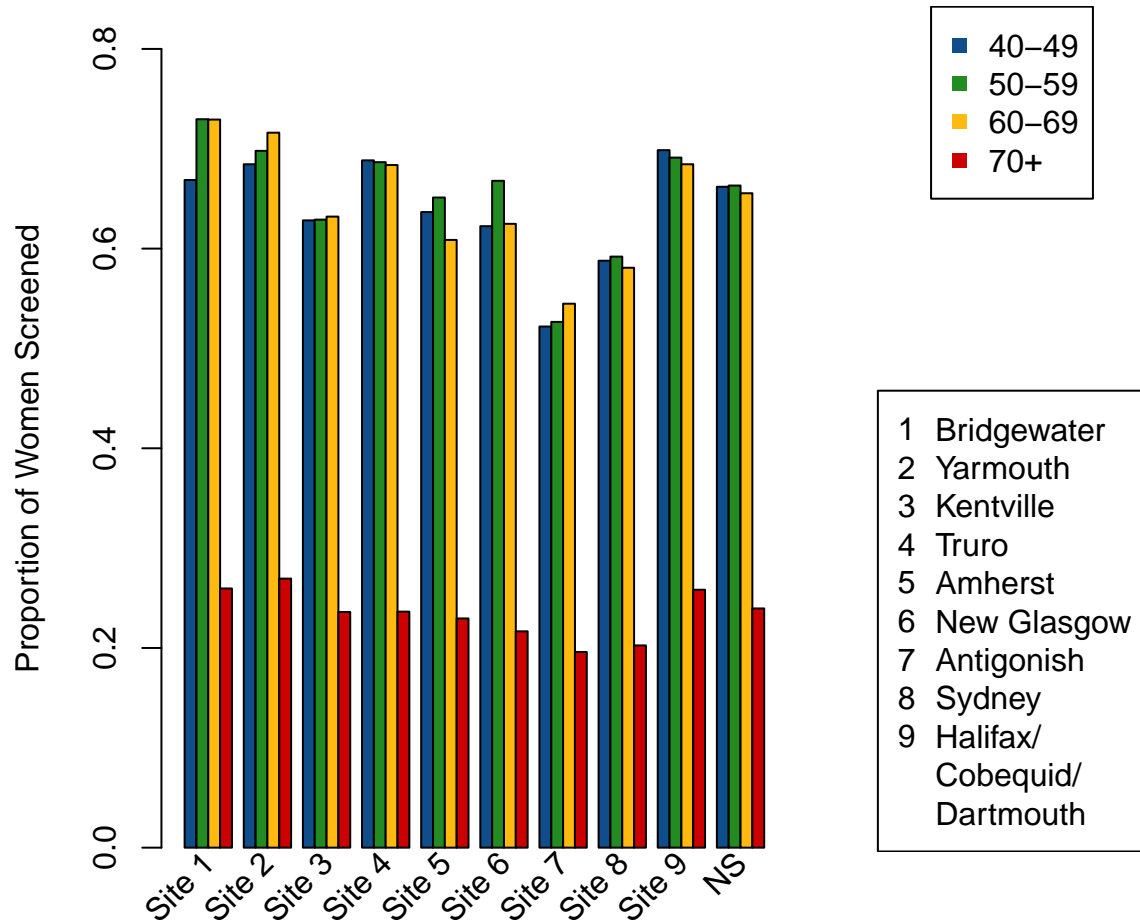


Figure 11.2: Screens per 1,000 Women (Aged 50-69), by Site

11.3 Database Development

From a simple flat file database available in 1991, a complete rewrite upgraded the NSBSP system to a user friendly and user developed relational database completed in 1997. A second rewrite began in 2002 and when completed in June 2004 resulted in standardized data entry procedures and outcomes for both screening and diagnostic mammography from one database. The diagnostic reporting system (DRS) is currently being used in Halifax, Cape Breton, Dartmouth General, Bridgewater, New Glasgow, Yarmouth and Amherst. Kentville, Truro and Antigonish are waiting for completion of the interface between DRS and the hospital information system before reporting in DRS. Until this occurs patients in those 3 districts cannot be followed up and tracked in the database by Central Mammography Booking as is the practice in all other districts.

In 2015 the NSBSP rolled out a significant modification to the existing MIS (Mammography Information System) and the DRS (Diagnostic Reporting System) which was named the BIS (Breast Imaging System). These modifications will improve user accessibility, standardization, work flow and will be interfaced with the provincial information systems.

11.4 Central Mammography Booking (CMB)

A project designed to book all breast screening appointments, both screening and diagnostic through one call center was completed and implemented in December 2000. Prior to this, it was only the first two mobile vans that utilized the booking center. Funding for computer interfaces and programming for this project was obtained through the federal government's Infostructure Support Program and the Canadian Breast Cancer Foundation - Atlantic Chapter. Initially the project enforced standard booking guidelines and booked appointments for two NSBSP vans, one NSBSP fixed site and one diagnostic center. Currently all breast imaging, screening and diagnostic, in the province is booked through Central Booking. Starting dates for diagnostic centers joining with CMB are seen in **Table 5.1**. All guidelines are strictly followed to ensure asymptomatic women that fit the criteria for screening are booked as such. Core biopsies and all breast ultrasounds, with the exception of District 3 (Kentville), are also being booked through Central Booking. A breast MRI reporting module has been developed with funding from the Public Health Agency of Canada (PHAC). All breast MRI is being centrally booked and reported in the database using synoptic reporting. This process ensures that breast MRI is being utilized appropriately, guidelines developed by the Department of Health & Wellness in 2008 are being followed and recommendations are being tracked in the database and followed up in a timely manner.

There is a considerable body of evidence that an abnormal breast cancer screening precipitates acute anxiety especially upon receipt of notification of the abnormal screen. Anxiety may persist for several months after resolution of the screening episode, even after the woman has been informed that she does not have cancer. *Waiting for a Diagnosis after an Abnormal Screen in Canada: Minister of Public Works and Government Services Canada, 2000*. With a goal of enabling NSBSP to process the bookings for provincial diagnostic mammography departments and to assist in channelling the flow of asymptomatic women to the screening program, CMB has successfully decreased waiting times at the diagnostic sites. With appropriate integration of diagnostic and screening mammography programs through one Centralized Mammography Booking system, short wait times for diagnostics can be maintained. Urgent situation can be addressed within a few days at all sites.

11.5 The Core Biopsy Program

Under auspices of NSBSP a core biopsy program was started to coincide with the program start in June 1991. Database development has permitted tracking these examinations. Since the beginning of the program in June 1991 until December 2016, a total of 18324 stereotactic core biopsies and a reported 2231 ultrasound

guided core biopsies have been performed on 17725 women. Results may be seen in **Tables 10.10 and 10.11**.

Promotion of stereotactic needle core biopsy as opposed to clinical or ultrasound guided core biopsy is preferred for the following reasons:

- in a screening population, lesions are nearly always identified by mammography, and if the core biopsy is benign they are followed by mammography. If lesions are malignant, they are localized by mammographic guidance and mammographic specimens to confirm excision
- stereotactic localization following stereotactic core biopsy, by design, also localizes the core biopsy track so that this can be removed at the time of surgery
- stereotactic films are very reproducible unlike ultrasound which is operator dependant
- many lesions identified by mammography (especially calcifications) are not seen during ultrasound guided core biopsy, even by experienced ultrasonographers
- documentation of a missed lesion by ultrasound is difficult but clearly present with the NSBSP stereotactic needle core biopsy approach *Nova Scotia Breast Screening Program Experience: Use of Needle Core Biopsy in the Diagnosis of Screening Detected Abnormalities, Radiology 1996*. For this reason, a negative ultrasound guided core biopsy is not as acceptable to many clinicians and the patient usually must go on to have surgery regardless of negative results.

“Core biopsy is a superior method for the evaluation of non-palpable lesions due to increased diagnostic specificity and reduced rate of inadequate samples.” *Brenner RJ, Bassett LW, Fajardo LL, Dershaw DD, Evans WP III, Hunt R, et al. Stereotactic core needle biopsy: a multi- institutional prospective trial. Radiology 2001; 218: 866-72*. In reports comparing stereotactic core biopsy to surgical biopsy, the sensitivity of core biopsy for diagnosis of malignant lesions varies from 85% to 98%. However in a multi-institutional study in which the results of 1,363 image directed core biopsies were compared with the results of subsequent surgical biopsies there was 98% agreement and only 1.1% false-negative core biopsy outcome (level III evidence). *Parker SH, Burbank F, Jackman RJ, Aucreman CJ, Cardenosa G, Cink TM, et al. Percutaneous large-core breast biopsy: a multi-institutional study. Radiology 1994; 193: 359-64*. **False negative core biopsy outcome from the Nova Scotia Breast Screening Program from 1991 to 2016 is also 1.1%.**

Over the first 25 years of the program there have been 32 malignant core biopsies for which the corresponding surgical outcomes were benign, resulting in a false positive rate of 0.2% (see table 10.11). The false-positive core biopsy outcome per woman is 0.2%. Atypical/suspicious and benign open surgical results are included when calculating the false positive rate.

For both stereotactic and ultrasound core biopsy to be successful there needs to be a validation process and team management.

Cancer has a significant economic impact in Canada as measured by direct and indirect costs. Direct costs refer to the value of goods and services for which payment was made and resources used in treatment, care and rehabilitation directly related to illness or injury. Indirect costs are defined as the value of economic output lost because of illness, injury-related work disability or premature death (*National Cancer Institute of Canada: Canadian Cancer Statistics 2004*). In 1998, in Canada, \$2.5 billion were direct costs with hospital care costing \$1.8 billion and representing 74% of this amount. Physician services to treat cancer cost \$333 million, or 14% of direct costs. Approximately \$210 million or 9% of direct cancer costs were spent on drugs for cancer treatment. The indirect cost was \$11.8 billion. *Economic Burden of Illness in Canada, Health Canada 2002*. Although the figures above represent costs for all cancers and for all Canadian provinces, the core biopsy program in Nova Scotia has made positive impacts on reducing wait times, hospital stays and physician services. It has made a huge impact in greatly decreasing benign breast surgeries.

Published works of the Nova Scotia Breast Screening Program include:

- Stereotaxis Needle Core Biopsy of Breast Lesions Using a Regular Mammographic Table with an Adaptable Stereotaxic Device (AJR 1994; 163: 317-321)
- Nova Scotia Breast Screening Program Experience: Use of Needle Core Biopsy in the Diagnosis of Screening-Detected Abnormalities (Radiology 1996; 198: 125-130)
- Ten Years of Breast Screening in the Nova Scotia Breast Screening Program, 1991-2001. Experience: Use of an Adaptable Stereotactic Device in the Diagnosis of Screening-Detected Abnormalities (CARJ vol 56, No. 2, April 2005)

11.6 The Pink Rose Project and Physician Assisted Navigation

The Pink Rose Project instituted the provision of “Information Packages” to newly diagnosed women at the time of imparting the diagnosis. Started and managed by a volunteer breast cancer survivor under the umbrella of NSBSP, this initiative has been adapted and introduced into most other provincial programs. Begun as a service provided by one hospital, the packages are now funded by the Canadian Breast Cancer Foundation - Atlantic Chapter, and distributed by pathology departments, NSBSP coordinators, Cancer Care personal as well as active survivors throughout the province.

With the development of NSBSP in 1991, physician assisted referral for all abnormal **screens** to the diagnostic work-up sites was instituted. The physician was always the first point of contact by phone, and with their approval the program would (also by phone) contact the patient with the date, time, place and nature of the work-up test or core biopsy. For even greater efficiency, the phone contact has been replaced with a faxed appointment process. As in all screening programs, results were also mailed to both the women and the physician. This fast tracking resulted in decreased times to diagnoses and overwhelming acceptance of the process. In 1997, requests from the medical community to also navigate women with abnormal reports in the **diagnostic** sector resulted in a full time navigation position. In addition, through personal contact with physicians and women, the navigator has promoted a heightened awareness of the clinical practice guidelines for mammography. This single NSBSP diagnostic-based navigator position has been closely tied to the largest diagnostic work-up site and is supported by the Pink Rose Project.

The NSBSP Navigator is a resource for women using diagnostic and screening facilities in the entire province, whether affiliated with NSBSP or not. *Patient Navigation: Improving Timeliness in the Diagnosis of Breast Abnormalities* was published in June 2004 in the *Canadian Association of Radiologists Journal (CARJ Vol.55, No. 3, June 2004)*. This publication documents the potential to decrease waiting times related to the facilitated investigation of breast abnormalities. Other provincial breast screening programs have incorporated a similar approach for fast-tracking women to diagnosis. *Influence of direct referrals on time to diagnosis after an abnormal breast screening result. Kathleen M. Decker MHS et al: Cancer Detection and Prevention 28 (2004) 361-367. Manitoba Breast Screening Program, Winnipeg, Manitoba.*

All results from the smaller diagnostic work-up sites are monitored by the NSBSP Image and Data Manager pending a status of case “completion”.

Published works of the Nova Scotia Breast Screening Program include:

- Patient Navigation: Improving Timeliness in the Diagnosis of Breast Abnormalities (CARJ Vol 55, No. 3, June 2004)

11.7 NSBSP Post Screen Cancers: Report and Learning Tool

In January 2006, with funding from a Canadian Breast Cancer Foundation - Atlantic Chapter’s Community Health Grant, a project was initiated with the aim to identify, assemble, classify and review the interval breast cancers diagnosed from NSBSP clients. A blitz enabled this work to be completed for the years 1991-2003 and thirty-five data charts were compiled, some results of which will be used for publication

Table 11.1: NSBSP Post Screen Detected Cancers

	Number of Women Screened	Radiologists' Diagnosis ^a				Intervals and Other Post Screen Cancers ^b				
		1	2	3	4	Interval Cancer Rate per 1000 screens	Interval Cancer Rate per 1000 Women	Recurrence	Contralateral	Non-Compliant
91-92	5,848	0	0	0	0	-	-	0	0	0
93-97	29,947	45	13	9	9	1.1	2.1	14	16	172
98-99	19,328	26	16	9	5	1.0	2.9	7	8	98
00-01	16,192	40	19	13	10	1.2	5.1	9	8	106
02-03	23,797	39	23	12	11	1.0	3.6	5	10	88
All	93,112	150	71	43	35	1.1	3.2	35	42	464

^aDiagnosis is made by three Radiologists, with the coding as follows: 1:3 normal diagnoses. 2:2 normal, 1 abnormal. 3:3 abnormal. 4: 1 normal, 2 abnormal.

^bcancer cases were diagnosed in women over age 40 and include both DCIS and invasive cancers

in an inter-disciplinary paper presently being written for publication by Imaging, Pathology and Oncology Departments at the QEII Health Sciences Center in collaboration with Dalhousie University.

Five NSBSP interpretation sites contributed cases for this review which resulted in 96% of all known interval cancers being reviewed in an organized fashion by a minimum of three radiologists. In addition, breast cancer pathology TNM coding was reviewed by pathology staff for accuracy and to provide feedback to the program. Data from the National Cancer Registry is also expected to contribute.

Following the review of films, a file of unique cases was compiled and has been made available for review by of the radiologists as a web based learning file. A summary table of work completed up to the end of 2003 is included. The process is now ongoing.

The true value of screening can only be understood if a screening program is able to follow its participants for all diagnosed cancers, including those not found through screening. The NSBSP is very unusual in being able to capture these data on all of its participants. The results of this review were recently presented at the Annual Meeting of the Radiological Society of North America (RSNA) in Chicago and the results of this review are currently being summarized for publication in the RSNA scientific journal.

11.8 Interval Cancers

The review of the post-screen cancers has led to an exciting research project led by Dr. Danny Rayson, a medical oncologist at the Cancer Clinic in Halifax. The research project team is the result of a new collaboration between Dr. Jennifer Payne, Prof. Mohamed Abdolell, Dr. Penny Barnes (pathologist), Dr. Rebecca McIntosh (pathologist), Dr. Tallal Younis (medical oncologist), Dr. Judy Caines, and Ms. Theresa Foley. The project involves understanding the differences between interval cancers and screen-detected cancers and was funded by the Capital Health Research Fund. It is believed that interval cancers are more aggressive in nature (i.e., more aggressive pathology) but it is hard to show this because of a lack of follow-up data of women who have been screened. The preliminary comparison of pathology characteristics between the two groups did in fact reveal that interval cancers were more aggressive in nature than screen-detected cancers. Early results of this were presented at the Annual Meeting of the American Society of Clinical Oncology last year. This past year, the project was expanded to include a comparison of the clinical outcomes of women with interval cancers vs screen-detected cancers. With the help of a 2nd year medical student, Ms. Ariel Burns, who was funded by a Norah Stephens award, the charts of these women were reviewed at both the Halifax and Sydney cancer clinics. Ms. Burns was able to find any missing pathology data as well as collect

information on breast cancer recurrence. Ms. Burns presented the completed pathology analysis at the Dalhousie Cancer Research Symposium and received an honourable mention for her poster. This research has since been published. See section 13 for the article reference.

11.9 Needle Core Biopsy

The NSBSP is an unusual screening program because it has incorporated the use of needle core biopsy (NCB) into its clinical practice guidelines. The use of NCB has been shown to reduce the rate of benign surgery in women. In 2008 Dr. Heather Curtis, a 4th year radiology resident working on her residency research project under the guidance of Dr. Jennifer Payne and Dr. Judy Caines, conducted a review of NCB rates within the NSBSP from 1991 through to 2006. This timeframe is extremely critical in that it precedes the introduction of FFDM. The review consisted of summarizing both the rates of NCB as well as the surgery rates within the program as a whole, as well as within each program site, over time. Finally, a similar summary was compiled for the benign:malignant ratio for both NCB and surgery, the latter one being a measure to assist in minimizing the surgery rate for benign (i.e., non-cancerous) growths. What Dr. Heather Curtis found was again a confirmation that the use of NCB is associated with a decrease in the number of benign surgeries. The comparison of figures over time across the sites revealed that although sites might have differed when NCB was first introduced, the variation in rates has been greatly reduced over time. Dr. Curtis presented these results at the Annual Dalhousie Radiology Research Day. This analysis will help the NSBSP set provincial targets for these performance indicators to help ensure that women across the province receive the same high quality care, regardless at which sites they receive their care. This analysis also serves as an important benchmark for comparison once FFDM has been implemented throughout the province.

11.10 Surveillance and Reporting

In 2008, Dr. Jennifer Payne received a one-year community grant from the Canadian Breast Cancer Foundation - Atlantic Region to develop a surveillance framework for the NSBSP. Although the NSBSP reports on a series of nationally agreed upon performance indicators, the NSBSP data holdings are much broader than those of many other provinces and therefore lend themselves to calculations of other indicators, including those both in the area of quality of care as well as service provision. Although the formal grant has been completed, the framework is now being used to review other possible indicators, such as those now developed in the area of wait times (see 11.5), and those produced out of the work in health services utilization (see 11.1) and how these indicators can be used both internally by the NSBSP and externally by stakeholders and to the public at large. In addition, the NSBSP is working on various ways of presenting indicators to stakeholders - as the calculations become complex, it's important to present information to stakeholders in a format that is useful and meaningful for them. As these forms of reporting are developed, the NSBSP will be consulting with its stakeholders on ways to expand and strengthen reporting of breast screening performance in Nova Scotia.

11.11 NSBSP Annual Report Automation

Prof. Mohamed Abdolell, with collaborators Dr. Jennifer Payne and Dr. Judy Caines, completed a Canadian Breast Cancer Foundation - Atlantic Chapter Community Health Grant funded project, "Automation of the NSBSP Annual Report: a first step toward developing a surveillance system". The primary goal of this project was to fully automate the process of generating the NSBSP Annual Report. In the past, the report has taken up to twelve months to generate manually and has been a major burden on the resources of the NSBSP. Through automation of the process, the report is now generated in 2 hours. Since 2007, the NSBSP annual report has been generated using this system. The natural consequence of developing such a system is that it can be extended to become a fully automated surveillance system that is flexible,

customizable, timely, accurate, reproducible, on-demand, and low-cost. The feasibility of applying Statistical Process Control methods in the proposed surveillance system has been evaluated and it has been determined that automatic flagging of emerging trends in the NSBSP to enable proactive intervention in the system to optimize resource allocation and improve access to screening for women in Nova Scotia is achievable.

11.12 Reminder Calls

As of Jan 2008 the NSBSP began offering reminder calls to all districts of the province that were booking mammography, both screening and diagnostic, through Central Booking. This service is being provided by Voice Services through the Capital Health and has proven to be very successful. What began as a semi automated process has been upgraded in 2009 to a completely automated system. No shows have been virtually eliminated at all sites since this process was implemented

11.13 Evaluation of Full Field Digital Mammography (FFDM)

As mentioned earlier, the transition to fixed site FFDM was completed in May 2010. Exploratory work has been underway to understand what this transition means for the women of Nova Scotia in terms of quality of care. In Canada, the performance of breast screening programs is measured through a series of standardized performance indicators, each with its own target. Programs can use these measures to monitor their progress over time and as well as against the country as a whole. These measures have now been evaluated for the one year period prior to the FFDM transition (analog) against the first 12 months of digital mammography, allowing for a 4-month transition period. These preliminary results revealed that digital mammography appears to outperform analog mammography for women aged 40-49 years, and to a lesser extent this is also true for women aged 50-59 years. It must be noted that these data are preliminary in that not all NSBSP sites are at this point in time able to contribute 12 months of data given that some did not transition until spring of this year. It must also be noted that radiologists review screening mammograms in relation to earlier mammograms and that in this specific instance, the earlier ones were analog. Therefore the “final” analysis of the FFDM transition will not be complete until radiologists are able to review digital mammograms in relation to at least one prior digital set of mammograms. As most women in the target age range of 50-69 years are screened only once every two years, it will be a while before we can truly understand the impact of FFDM on quality of care.

11.14 NSBSP Response to Canadian Task Force on Prevention Health Care’s Recommendations for Breast Screening

On Nov 21, 2011 the Canadian Task Force on Preventative Health Care released recommendations for screening mammography in Canada. Although these recommendations did differ somewhat from the current recommendations, NSBSP is operating within these guidelines. In response to the Task Force recommendations the NSBSP developed an information sheet that was sent to stakeholders throughout the province. The contents of that information sheet are presented below.

There are two clinical categories of mammography: **screening** and **diagnostic**.

Screening mammography is for asymptomatic women aged 40 and over who have no breast symptoms and who do not have a personal history of breast cancer.

Diagnostic mammography is for symptomatic women, women with implants, women with a personal history of breast cancer and for workup of anyone who receives an abnormal screening mammogram report. This population should have the shortest wait time for breast imaging. Diagnostic mammograms take longer to perform, longer to be interpreted by a breast imaging radiologist and are more expensive to the health

care system.

All breast imaging in Nova Scotia (screening and diagnostic) is booked through NSBSP Central Booking which has enabled Nova Scotia to **eliminate opportunistic screening** (screening asymptomatic women in the diagnostic sector as opposed to an organized program). This ensures that all eligible asymptomatic women requesting breast screening are screened through an organized program. All outcomes are tracked and readily available for the entire province in real time. Nova Scotia is the only province to date that manages all breast imaging through an organized program.

Although the NSBSP targets women aged 50-69, it became apparent when the program first began back in 1991 that women aged 40-49 were demanding mammography. A conscious decision was made at that time to accept them into the screening program; the cost to the health care system is less and these women can be tracked with readily available outcomes. If women 40-49 were accommodated through physician referrals in the diagnostic sector, the diagnostic sector would become overwhelmed and the true diagnostic patients would suffer increased wait times.

11.14.1 CTFPHC Recommendations vs NSBSP Clinical Practice Guidelines

Task Force: Does not recommend routine screening mammography for women aged 40-49 but states women may choose to screen if they place a high value on the small reduction in breast cancer mortality (demonstrated in the randomized controlled trials that they reviewed). The Task Force also notes that access to high quality facilities with the necessary equipment and expertise in mammography is required to undergo screening.

Provincial and regional decision makers should consider whether access is adequate for people in their jurisdiction who reside outside major centers. Mobile screening units may help to increase access to screening among rural/remote dwellers.

Nova Scotia Breast Screening Program currently practices within these guidelines: NSBSP accepts women aged 40-49 into the program but **does not actively recruit them**. If women do opt for screening they are directed to the organized program where they can be monitored and outcomes are available. Similar to the practice for other countries that screen this age group, these women are followed with annual screening mammography. The breast tissue in this age group is generally denser, making early detection more difficult. In addition, breast cancers detected in younger women, although less frequent than older women, are generally more aggressive and grow at a (more) rapid rate.

Currently in Nova Scotia 56% of women aged 40-49 are having screening mammography through the organized program over a two-year period. An organized program ensures there is a certain standard of care across the province and outcomes are monitored and evaluated. In all of the other provinces and territories across the country, breast screening is performed both inside and outside organized programs (known as opportunistic screening) making it difficult or impossible to report on the true participation rates and outcomes. Nova Scotia has eliminated opportunistic screening.

The Task Force review **did not include** any studies with digital mammography. All fixed screening sites in Nova Scotia utilize digital mammography (thanks to funding from the Nova Scotia Government). Nova Scotia's initial results show digital mammography is better at picking up cancers with fewer work-ups than film mammography in almost all age groups, especially for women 40-49. This means fewer mammograms are reported as abnormal requiring further imaging and at the same time more breast cancers are being detected.

One reason the CTFPHC does not recommend screening women aged 40-49 is the chance of having a false positive mammogram is higher in this age group and can lead to further investigation including other (potentially) unnecessary procedures such as surgery. Figure 4 demonstrates the estimated rates of unnecessary procedures, according to the Task Force, for a group of women screened every 2-3 years for a period

	Screening Mammography for 40-49	Screening Mammography for 50-69	Screening Mammography for 70-74	MRI Screening	Clinical Breast Exam (CBE)	Routine Breast Self Exam (BSE)
CTFPHC	Screening not recommended, but if a women choses, service should be available through an organized screening program	Screening is recommended every 2-3 years	Screening is recommended every 2-3 years	Not recommended	Not recommended	Not recommended
NSBSP	No active recruitment, but service available. Recall sent out for annual screen for those who opt in.	Screening recommended every 2 years. Recall sent out for biennial screen	Service available but no recall reminders sent out	Not recommended	Modified CBE performed by Technologist at screening	Not recommended

Table 11.2: Comparison of NSBSP guidelines vs. recommendations by CTFPHC

Per 1000 women screened		40-49y	50-69y	70-74y
False Positive Mammograms		210	143	76
Unnecessary (Benign) Biopsies	Needle Core	60	48	25
	Surgical	12	10	6

Table 11.3: NSBSP Results (women screened 2000-2011)

of 11 years. Figure 5 shows the actual rates in Nova Scotia using the same inclusion criteria as the Task Force for women screened in 2000 and followed through to 2011. It would normally be expected that the false positive rate decreases with increasing age however the actual false positive mammogram rate of women aged 40-49 in Nova Scotia for the most recent 11-year period is lower than that projected by the Task Force rate for women aged 70-74.

The last Cancer Registry report 2003-2008 for Nova Scotia showed a 4% reduction in mortality (statistically significant) compared to the previous registry report 5 years before- 1998-2003. Some will say that is because of better treatment but this same report also shows a reduction in newly diagnosed invasive disease in women aged 50-65 by 13%. This cannot be due to treatment but was likely due to early detection in screening women 40-49 for the 10 years prior.

Nova Scotia has the lowest number of benign breast surgeries in the country thanks to the use of needle core biopsy. In Nova Scotia a requirement of the breast screening program is to provide high quality standardized mammography access and care with timely assessment, informed patient navigation and appropriate follow up of women who have abnormal mammograms on screening through complete diagnostic work up including needle core biopsy in accredited work up centers before consideration of surgical intervention. Women do not proceed to breast surgery unless proper work up has been completed and surgical intervention

Per 1000 women screened	40-49y	50-69y	70-74y
False Positive Mammograms	327	282	212
Unnecessary (Benign) Biopsies	36	37	26

Table 11.4: CTFPHC Results for 11 year screening period

<i>Provincial/territorial breast screening programs that accept women 40-49</i>	<i>Provincial breast screening programs that do not accept women 40-49</i>
Northwest Territories Yukon British Columbia Alberta Manitoba* Quebec* New Brunswick* Prince Edward Island Nova Scotia Newfoundland & Labrador* <i>*With physician referral</i>	Saskatchewan Ontario

is warranted.

Note

The Task Force states that women should be given enough information to make an informed decision in regards to screening mammography. For the past two years the NSBSP has distributed to all physicians across the province copies of the Mammography Decision Aid published by the Public Health Agency of Canada (http://www.phac-aspc.gc.ca/cd-mc/pdf/Information_on_Mammography-eng.pdf).

11.14.2 Summary

The NSBSP is operating within the recommendations of the CTFPHC. Women 40-49 are not actively recruited, but those opting for screening are done through the organized program with high quality standardized care and real time monitoring of clinical outcomes. Women 50-69 are routinely screened every 2 years. Women 70-74 are accepted into the program but are not sent reminders to rebook; this will be reviewed by NSBSP. The NSBSP does provide a modified breast exam to all screening clients. Routine Breast Self Exam is not currently recommended by NSBSP, which is consistent with the Task Force recommendations. The NSBSP does not recommend screening with MRI.

11.15 Reminder Postcards

In the spring of 2012 the NSBSP replaced its aging envelope inserter and postcard printer, two pieces of equipment vital in the preparation of correspondence with women across the province. The NSBSP took this opportunity to update the reminder postcard and its preparation process.

Using specialized mailing software the NSBSP is now able to apply the National Change of Address (NCOA) database to its postcard mailouts. This has drastically reduced the number of pieces returned to the program and, more importantly, insures more clients receive their reminder postcard.

In the redesign process, the NSBSP worked in collaboration with Canada Post to have the postcard designated as *Addressed Admail*. As a result of this designation the cost of postage for each postcard has been reduced approximately 33%. The cost savings from this has dramatically helped offset the cost of the new envelope inserter and postcard printer.

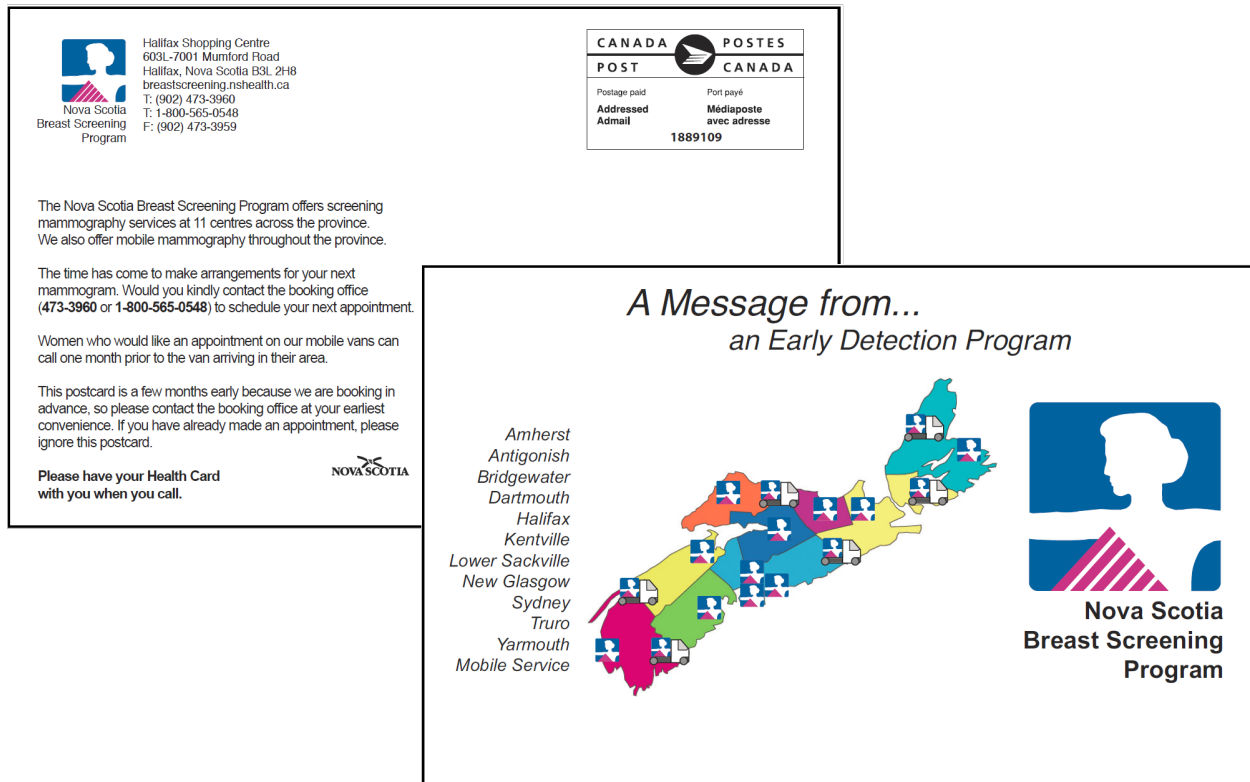


Figure 11.3: Redesigned Reminder Postcard

11.16 Telephony Upgrade

The Nova Scotia Breast Screening Program (NSBSP) has operated its Central Booking Office since the program began in 1991. The booking office has grown in capacity and now receives thousands of calls every week from across the province. The NSBSP Central Booking Office has utilized the same legacy telephony system since 1991, a Central Exchange (Centrex) system.

The legacy telephony system was unable to record incoming calls. This prevents the NSBSP from carrying out quality assurance exercises that would ensure client satisfaction is maintained.

The legacy telephony system was also structured in a way that hindered workflow efficiency. All incoming calls are placed into a single queue that is answered by booking clerks meant to take calls only for screening mammography. There was no mechanism for automatically distributing calls to the appropriate staff. Reporting capability with this system was also limited.

The NSBSP, in close collaboration with HITS-NS and CDHA Voice Services, managed the installation of a new Voice over IP (VoIP) telephony system for the NSBSP Central Booking Office in June of 2013. This modern telephony system (Infinity by AmTelCo) offers a number of features that have enhanced the ability of the NSBSP to monitor and improve its central booking operations; Call Recording, Enhanced Reporting, and Multiple Call Queues. Transitioning to a VoIP-based telephony system has also reduced the operating costs of the NSBSP telephony system.

11.17 Mobile Breast Screening

Breast screening in Nova Scotia began as one fixed site at the Halifax Shopping Centre in 1991 and three mobiles expanded screening services to the rest of the province over the next 11 years. As of 2008 there are 11 fixed sites across the province and until January 2013 there were still three mobile units. Mobile breast

screening was revised to compliment the services delivered at the 11 fixed sites. It is with the intent to reach populations distanced from the fixed sites that mobile breast screening operates. In 2009, 62% of all mobile screens were performed within a 30km radius of at least one fixed site.

The objective of this initiative was to examine existing mobile scheduling for the purposes of optimizing time and resources to better serve areas in the province lacking access to breast screening. Specifically, this initiative examined existing routes and booking utilization.

The NSBSP, together with the DHW and the 3 district operators, proposed to move to a single, digital mobile screening unit for the entire province, effect January 2013. In moving to a single, digital mobile unit, every woman in Nova Scotia will be guaranteed to have her mammogram performed digitally.

The mobile focused on providing service to areas that cannot easily access fixed site service. Criteria for mobile stop service include: Distance from a fixed site/other mobile stop(s), hard to reach populations, and utilization.

Increasing capacity at fixed sites will absorb the mobile screens that used to occur in close proximity to these sites. It is anticipated using a single, digital mobile unit for the entire province will make mobile screening more cost-effective. Distances traveled by one mobile will be greatly reduced and mobile utilization will be maximized. In total, 30 stops are part of the provincial, digital mobile route (see table 12.1 and figure 12.1).

Sydney	North Sydney	New Waterford
Glace Bay	Neil's Harbour	Cheticamp
Inverness	Pictou Landing	Tatamagouche
Parrsboro	Indian Brook	Kennetcook
Glooscap	Middleton	Digby
Long Island	Clare	Shelburne
Liverpool	Caledonia	Preston
Sheet Harbour	Sherbrooke	Guysborough
Canso	Arichat	Strait Richmond
Whycocomagh	Baddeck	Eskasoni

Table 11.5: Mobile stops for the digital mobile screening program

Of the 30 mobile stops selected for the provincial digital mobile route, 12 are located on Cape Breton Island and did not require any additional upgrading at the time. The digital mobile has been operating on Cape Breton since 2007 and the sites are already digital-ready. These stops will be reviewed at a later date to ensure they continue to meet all requirements. Electrical and telecommunication upgrades were required at all 18 mainland stops. Only eight mainland stops required ground work to be completed where the mobile would be positioned. Having a level surface for the mobile to park is important to the proper function and maintenance of the trailer and equipment.

Because of time limitations, upgrade work was carried out in the same order as the scheduling of mainland visits to ensure work would be completed in time for each mobile stop. The first mainland mobile stop took place on June 10th, 2013 at Pictou Landing. All work was completed in time for the arrival of the mobile at each of the 18 mainland mobile stops. All 30 stops had a mobile visit in 2013.

A year-end report was completed in 2014 specifically for the mobile unit, highlighting the transition to a single provincial mobile, issues that arose and insights going forward. A comparison of volume of women screened on the mobile over the transition years was completed to ensure that the mobile is being utilized. See chart.

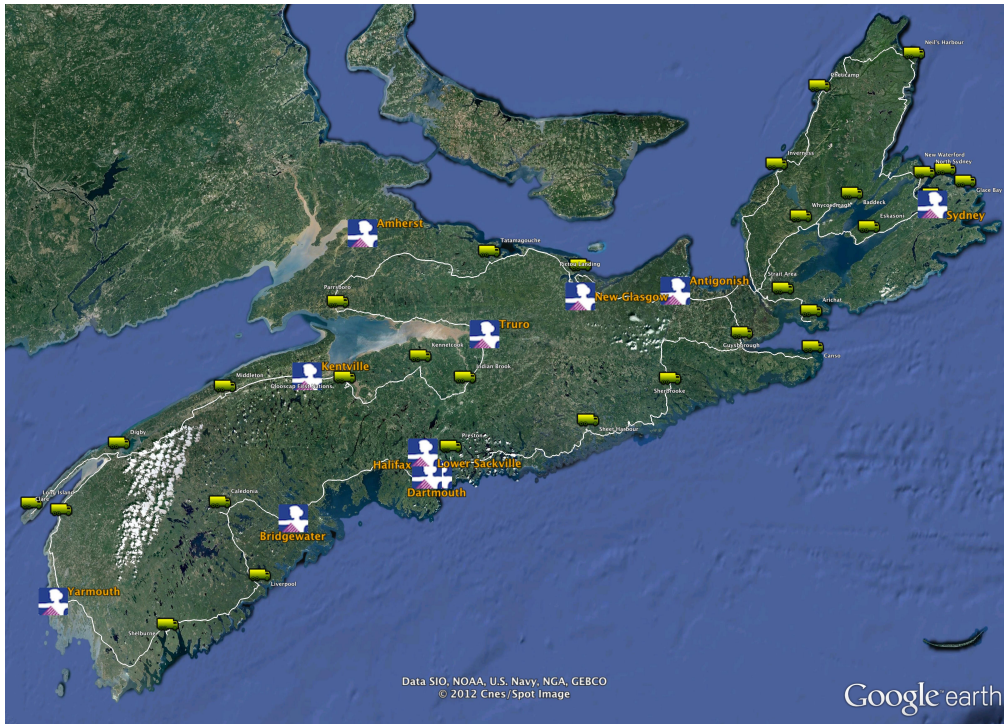
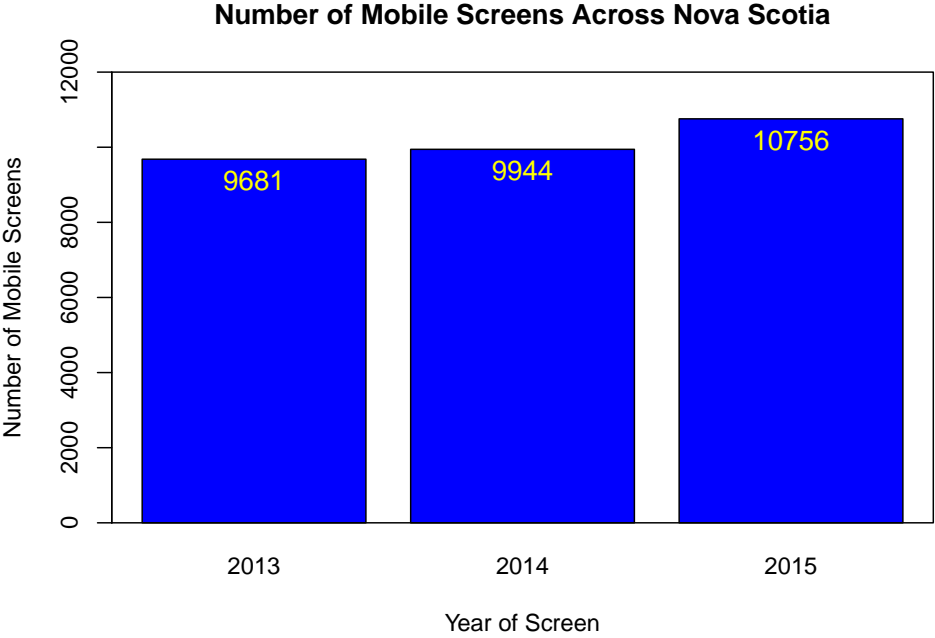


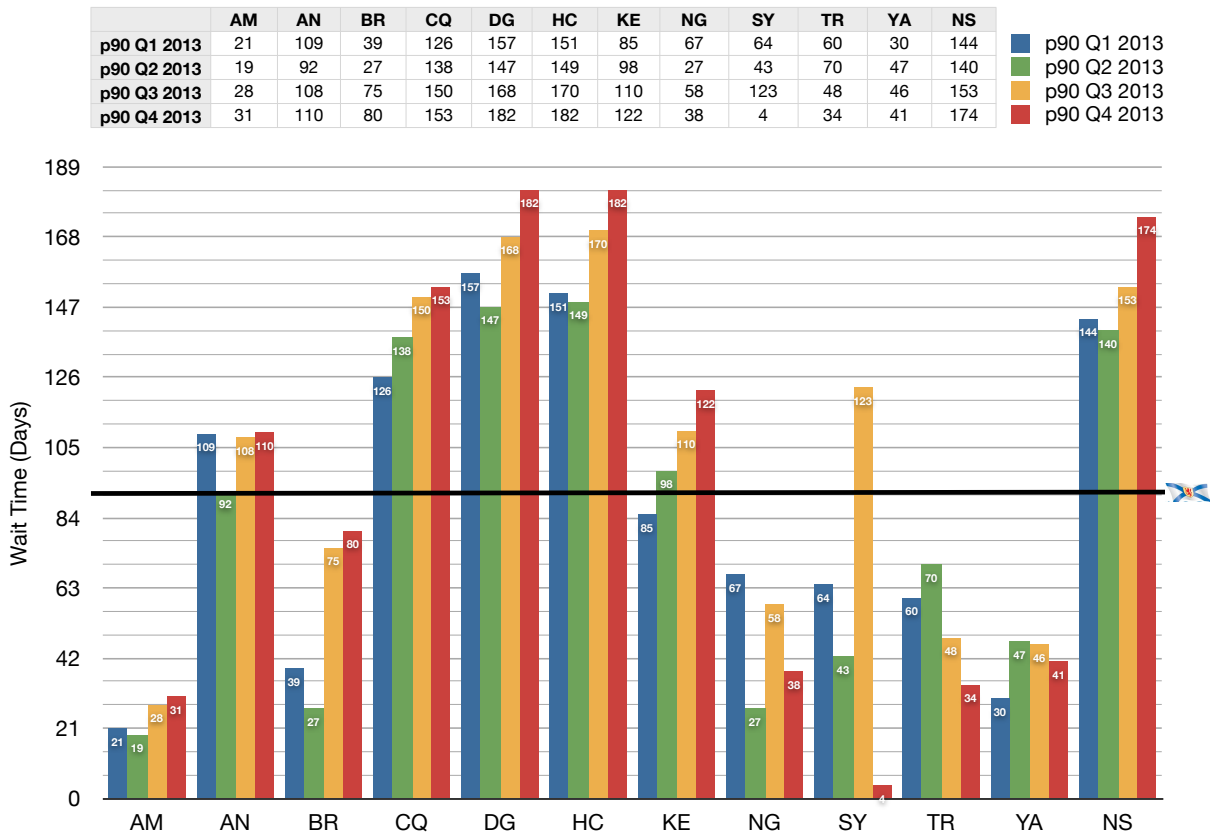
Figure 11.4: Mobile Route



11.18 Wait Times

As part of a province-wide initiative within the NS Department of Health & Wellness, the NSBSP has been revising its measurement of wait times and has now joined other areas of diagnostic imaging in reporting

Figure 11.5: Screening wait times (90th percentile)



wait time publicly.

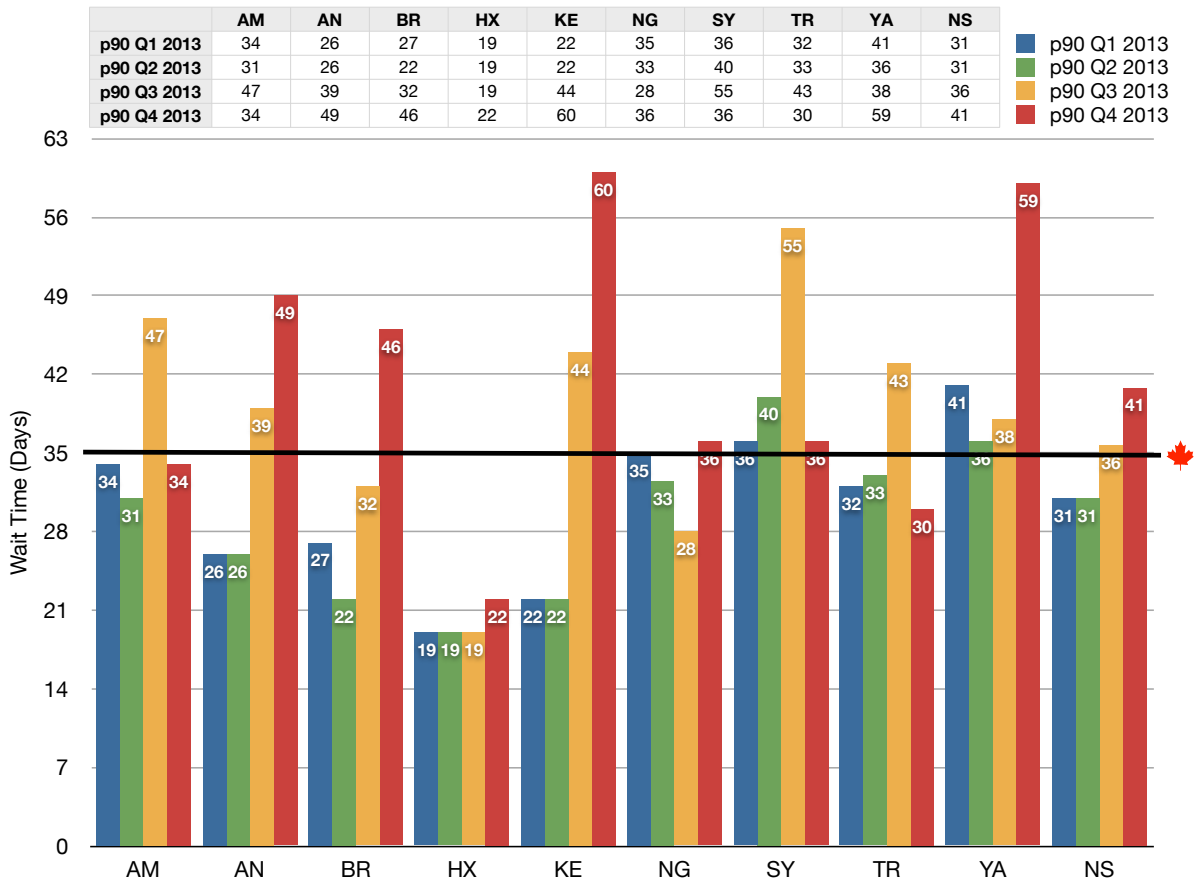
In the past, wait times for the NSBSP were defined as the wait until the next day with 3 available appointments for a given procedure or test. The NSBSP now follows the standard approach of reporting wait time retrospectively, instead of prospectively. These new measures will now accurately reflect how long people have waited to have procedures performed.

The NSBSP now reports nine wait time indicators to the DHW and all DHAs: Screening Wait Time (Figure 11.5); Screen to Work-up (Figure 11.6); Screen to Report; Report to Work-up; Diagnostic Wait Time; Image to Core; Screen to Core; Work-up to Core and Core to Surgery.

The data elements captured within the NSBSP database make it easy to calculate wait times. The wait times calculated are median (i.e. the number of days 5 out of 10 women waited) and 90th percentile (i.e. the number of days 9 out of 10 women waited). The results are sent electronically every quarter to the Department of Health & Wellness as well as every breast imaging manager, radiologist and lead technologist, and DHA CEO in the province.

For more information on the provincial wait times initiative, please consult the government website (<http://waittimes.novascotia.ca>).

Figure 11.6: Work-up Wait Times (90th Percentile)



11.19 Male Breast Disease

Dr. Kristin Greenlaw, with collaborators Dr. Sian Iles, Dr. Robinette Butt, Dr. Peggy Yen and Dr. Jennifer Payne, are using data from the Nova Scotia Breast Screening Program over a 13 year period to investigate male breast disease. There is very little known about the incidence and the methods of diagnosis of male breast cancer within the population of Nova Scotia, Canada. The objectives of the study were to: describe the burden of male breast disease, including histological features of benign and malignant conditions, describe the utilization of radiological procedures in the investigation of male breast disease in Nova Scotia, and to assess the validity of the BI-RADS grading system in the population of Nova Scotia.

Results showed that the majority of male patients who presented to diagnostic imaging underwent mammography alone, with a smaller proportion undergoing ultrasound and mammography, or ultrasound alone. Mammography alone was shown to have a higher positive likelihood compared to ultrasound. Male breast cancer is rare, with only 16 cases in the 13-year period. In contrast, gynecomastia is very common and can sometimes be difficult to differentiate from malignancy by imaging. There were a high number of false positive cases with gynecomastia and in total, suggesting that more education is required in regard to differentiating the imaging appearance of malignancy and gynecomastia. Results showed that BI-RADS assessment is useful in male patients.

Although uncommon, male breast disease is an important component of breast imaging. The results of this study provide insight into the clinical pathway of male patients, burden of male breast disease, and accuracy of imaging tests.

11.20 Pan Canadian Mortality Study

In the published literature, most of the clinical trials aimed at describing the association between screening and breast cancer mortality were undertaken many many years ago. The results of these studies are limited in their value now, given advances in diagnostic and treatment, and do not represent the value of screening in a real world context. Investigators at the BC Cancer Agency designed a study aimed at examining breast cancer mortality as a function of participation in organized breast cancer screening in Canada, and invited screening programs from across the country to join the study. The Nova Scotia Breast Screening Program, with the collaboration of Cancer Care Nova Scotia, joined as one of the participating provinces (BC, MB, ON, QC, NB, NS, NL). The objective of the project was to observe the breast cancer mortality of women in the province as a function of participation in organized breast cancer screening. The study revealed that women participating in breast screening programs experienced a lower rate of breast cancer death than those who did not participate in these programs. The findings of this study have been published in the Journal of the National Cancer Institute.

11.21 Invitation to Screening

The NSBSP was successful in an application to the CBCF-Atlantic Community Grant in 2013 to invite women aged 50-69 to the screening program who have never previously participated or have not returned in the last 5 years. With all breast imaging in the province now affiliated with the NSBSP, and the rollout of Full Field Digital Mammography (FFDM) across the province complete, the timing is right to reach out to the unscreened population.

Starting February 2014, the NSBSP sent an invitation letter to these women, informing them of the free service available, how to book an appointment, and the importance of early detection. This project directly addressed the need to inform un-screened women of the importance of early detection of breast cancer and clearly outlined the process required to book a screening mammogram at a site of their choosing.

The practice of inviting non-participants to an organized screening program is part of other Canadian provinces' breast screening operations. Nova Scotia did initially send out invitations but has not been able to invite women over an extended period of time due to capacity issues. This roadblock was addressed with the addition of FFDM across the province. By directly targeting un-screened women, the NSBSP is making this initiative as cost-effective as possible.

As of 2011, there were an estimated 140,482 women aged 50-69 in Nova Scotia.

Percent of Mammograms Booked After an Invitation Letter, "Never Screened" vs "Non-Compliant", Women Ages 50-69.

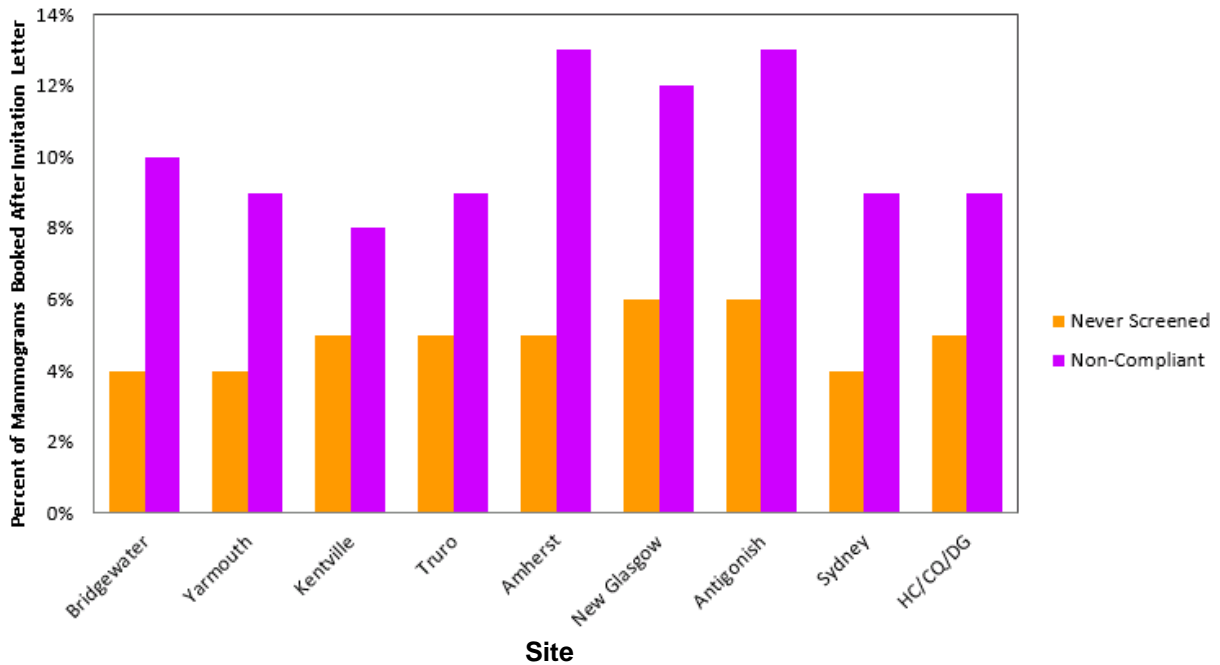


Figure 11.7: Looking at the effect of the invitation letter, by DHA

the NSBSP has screened 97,090 women aged 50-69 in Nova Scotia. The NSBSP estimates there are 41,550 eligible women aged 50-69 in Nova Scotia who have not received screening mammography services. This population was sub-divided into 3 equal groups- one third received a letter only, one third received a letter followed by a phone call and the third group were considered a control group and initially did not receive a letter or a call. After the period of 1 year the third group also received a letter. The calls have been completed in Dec 2015 as this was a considerable amount of work to add to existing staff.

Short-term goals of this initiative are:

- Increase call volume to NSBSP central booking office
- Increase volume of screening mammograms scheduled across Nova Scotia for women 50-69

Long-term goals of this initiative are:

- Increase screening participation rates across all Nova Scotia DHAs
- Reduce mortality rate from breast cancer

Figure 11.7 has a breakdown of the results of this initiative.

12 Current Initiatives

12.1 BIS Requisition Module

In December 2015, the NSBSP began receiving and sending all faxed requests for diagnostic breast imaging electronically. However, deficiencies were recognized in this semi automated eFax process. In 2016, to address these deficiencies, the NSBSP expanded the Breast Imaging System (BIS) to include a Requisition Module and replaced the eFax process.

In the new BIS requisition module, all incoming requisition faxes are electronically routed to the corresponding breast imaging site folder based on the fax number that they were sent from. The incoming requisition faxes will also automatically populate the same folder located on the desktop of the booking staff who is responsible for booking the breast imaging appointments for that site.

Any incoming faxes that do not populate the corresponding site folder (i.e. the fax number was not recognized) are stored in an "Unsorted" folder, and are manually transferred to the appropriate site folder by the booking staff.

After the faxed requisition has been received electronically, the booking staff schedules the appointment for the appropriate procedure in the information system. An electronic sticker with the appointment date/time is then generated and placed on the faxed requisition as an annotation. This ensures that the correct appointment information is displayed on the requisition when it is electronically faxed back to the primary care provider's office. If additional information needs to be conveyed to the primary care provider, custom notes can be annotated and added to the requisition.

Once the booking process is completed, and the breast imaging appointment date/time annotation has been placed on the requisition, the requisition can be electronically faxed back to the referring primary care provider's office. Cover sheets and additional PDF's can also be attached and sent to the primary care provider when required.

Proactive booking of radiologist recommendations is also done using the BIS Requisition Module.

Not only does this process eliminate the risk associated with faxing appointment information to a wrong number, or faxing the incorrect appointment date/time to the primary care provider, it is also cost effective and efficient. The Central Booking Office is now virtually paperless.

12.2 Mammography Image Retention

All breast screening sites are responsible for the secure storage of their respective film screen mammograms. A Breast Image Retention Process was developed to address the retention requirements of patients' film screen mammograms.

All breast images must be retained for a minimum of 10 years, notwithstanding:

1. All breast images of patients diagnosed with breast cancer must be kept indefinitely.
2. The two most recent previous mammograms must be retained, even if older than 10 years, and even if it is a film screen.
3. Breast images of deceased patients (without a previous diagnosis of breast cancer) can be purged 10 years after death.

A patient's film screen mammograms cannot be purged if one of the three criteria above apply to the patient.

A patient's film screen mammograms can be purged if none of the three criteria above apply to the patient. The screening visit for the purged images must be flagged in the breast imaging system (BIS). Lastly, it is recommended that this purge process be carried by mammography staff at each site to ensure that the process is carried out appropriately.

12.3 Knowledge to Action

As part of the NS Department of Health & Wellness, the NSBSP supported the 'Strength in Numbers' project, led by the 13 First Nations Communities in Nova Scotia, which concluded in March 2016. By way of the Nova Scotia First Nations Client Linkage Registry (NSFNCLR), the NSBSP reported on breast screening data specific to First Nations community members.

This earlier project has given rise to a new one, 'Knowledge to Action', and as part of the IWK Health Centre, the NSBSP recently provided recommendations to First Nations communities on future approaches to reporting breast screening data for First Nations communities. It is expected that in the coming year, the program will be reporting on updated breast screening data to community members.

12.4 Strength in Numbers

The Nova Scotia Department of Health and Wellness collaborated with several Mi'kmaq First Nations on the 'Strength in Numbers' project. This collaboration involved the Nova Scotia Breast Screening Program, along with several other programs within the NSDHW, including :

- Cancer Care Nova Scotia
- Cardiovascular Health Nova Scotia
- Diabetes Care Program of Nova Scotia
- Nova Scotia Renal Program
- Reproductive Care Program of Nova Scotia
- Public Health
- Mental Health and Addictions
- Business Intelligence Analytics & Privacy
- Nova Scotia Trauma Program

This project built on the earlier success of the 'Telling our Stories' project, a partnership established in 2012 with five Cape Breton First Nations Bands.

By way of the NS First Nations Client Linkage Registry (NSFNCLR), the NSBSP was able to report several breast screening performance indicators for the target age range of 50-69 for First Nations women. The indicators included:

- Participation Rate
- Retention Rate
- Abnormal Call Rate
- Diagnostic Interval (time to resolution)
- Positive Predictive Value
- Cancer Detection

Where possible, comparisons to Nova Scotia results were made. This information will aid in identifying areas of improvement in breast cancer screening in the First Nations communities in Nova Scotia.

12.5 NSBSP Screening for High Risk Women

Currently, the NSBSP Clinical Practice Guidelines (CPG) are intended for average risk women aged 40 to 69 years. Opportunities exist for revising the NSBSP CPG to include management of high risk women. These include, but are not limited to:

- Systematically identifying women at high risk for breast cancer.
- Solidifying the role of the patient navigator in coordinating the screening mammogram, MRI and follow-up of abnormal screening results.
- Determining how Central Booking can be used to manage mammography and MRI appointments for high risk women.
- Revising communication of messages and results with patients and physicians regarding high risk screening.
- Collaborating with the Maritimes Medical Genetics Clinic to address current issues in referring high risk women directly to NSBSP.

In Oct 2016 a consensus meeting is planned to determine the following:

- Screening modalities
- Relative timing and order of modalities
- Length of screening interval
- Criteria for defining women at high risk of breast cancer

12.6 Developing empirically based BI-RADS scales from FFDM

Prof. Mohamed Abdoell, with collaborators Dr. Peter Gregson, Dr. Gerry Schaller, Dr. Jennifer Payne and Dr. Judy Caines, obtained co-funding from Capital Health Research Fund, the Department of Diagnostic Imaging, and Canadian Breast Cancer Foundation-Atlantic Region Community Health Grant for the project, “Developing empirically based BI-RADS scales using breast density measurements from full-field digital mammograms.”

High breast density is associated with an increased risk of breast cancer, and is currently used by the Nova Scotia Breast Screening Program to adjust screening intervals for high-risk women (e.g., annual recall rather than biennial for women with very dense tissue). Current clinically accepted measures of breast density have been developed on Film Screen Mammography (FSM), and are determined by radiologists’ visual assessments. Nova Scotia has been exclusively using Full-Field Digital Mammography (FFDM) since the beginning of 2013, and yet no accepted standard for measuring breast density in FFDM exists.

One of the objectives of this project was to explore the feasibility of automating breast density measurements based on FFDM images that might ultimately lead to standardized measures of density being incorporated into the existing NSBSP data holdings. The results from this study have demonstrated that an algorithm could feasibly generate density measurements from FFDM images that are associated with an increased risk of cancer in women with high breast density. With a standardized and reliable measure of density the hope is that future work will enable development of breast cancer risk models that can guide personalized screening protocols.

12.7 NSBSP Governance Restructure

In 2004, the Department of Health approved a Provincial Program Model and accountability framework to guide the operations and governance of “provincial programs”. The approved model identified three criteria for identification as a “provincial program”:

- Significant opportunity to improve health outcomes
- Congruence with vision, mission and strategic direction of the Department of Health
- Benefit to Nova Scotians and DHAs/IWK with a positive cost-benefit, potential to change variance in practice, and potential to alleviate the significant burden of illness.

In 2011 the Department of Health and Wellness initiated a review of provincial programs in Nova Scotia. The scope of review included an assessment of adherence to the 2004 provincial program model, areas for improvement through inter-program collaboration, consolidation or integration, and effectiveness of current approaches (scope and activities, standards development, program delivery mechanisms, education offerings, monitoring and evaluation functions.)

The review resulted in the following direction: The NSBSP will be hosted by the IWK Health Centre and have dual reporting to both the IWK and the Department of Health and Wellness. Initial discussions between the NSBSP, DHW, IWK, and CDHA started in early 2013 to plan the transition. From these discussions it was decided the NSBSP would report to the VP of Patient Care at the IWK for matters related to its service delivery components, whereas the matters related to provincial program aspects of the program would remain under the structure of the Acute and Tertiary Care branch of the DHW.

In 2014 the health care system in NS began a restructuring process. This resulted in the 9 former health authorities and The IWK Hospital being consolidated into two health authorities as of April 2015; The Nova Scotia Health Authority and The IWK . The second phase of this restructuring resulted in a redesign of the Department of Health and Wellness

The new structure has four branches: investment and decision support; system strategy and performance; corporate service and asset management; and client service and contract administration.

This new structure allows for the Department of Health and Wellness to focus on setting priorities, measuring results, and getting out of the operational management and delivery of health services. As a result in, April 2016, the NSBSP became a Provincial Program of the IWK Health Center. The transition to an organization that has a large focus on women’s health aligns nicely with the NSBSP and will position the program to allow for further collaboration and partnerships in the years ahead.

12.8 Technologist Training Tool

In co-ordination with the Nova Scotia Mammography Working Group and the Nova Scotia Diagnostic Imaging Management Advisory Committee, the NSBSP is updating the standard training tool for Medical Radiation Technologists (MRT) new to breast imaging in the province.

The tool is based on MRT qualification requirements from the Canadian Association of Radiologists (CAR) Mammography Accreditation Program (MAP) and designed to provide a robust exposure for MRTs to breast imaging. The tool recommends a training period of 6-12 weeks depending on site volume and scheduling.

An outline of the recommended training schedule is provided below:

<p>Weeks 1-3 (Introduction Phase)</p>	<ul style="list-style-type: none"> • Provide overview of Safety Code 33: Radiation Protection in Mammography • Provide overview of the Nova Scotia Breast Screening Program. • Provide overview of mammography, ultrasound, needle core biopsy, wire localization, specimen imaging, and galactogram. • Provide opportunity to liaise with breast imaging radiologist • Provide an overview of special mammography views including: <ul style="list-style-type: none"> – Roll views – Full magnification – Lateral pulls – Axillary tails – Medial pulls – 90 – Spot compression – Eklund views – Spot magnification – Cleavage views • Learn about: Clinical Breast Exam (CBE) & Breast Self Examination (BSE) techniques. • Train: Computer system(s), taking histories, workflow, and mammography QC. • Allow technologist-in-training to positioning with assistance, when comfortable. Technologist-in-training should be positioning 1/2 of every case (1 CC & 1 MLO) under direct supervision by end of week 1.
<p>Week 2 (Direct Supervision Phase)</p>	<ul style="list-style-type: none"> • Technologist-in-training should be positioning for entire mammogram procedure under direct supervision. • Technologist-in-training must complete and record 50 mammograms under the direct supervision of an experienced Technologist. <p>(Note: due to variations in appointment volume, some sites may require longer than one-week to complete the direct supervision phase of training)</p>
<p>Weeks 3-12 (Close Supervision Phase)</p>	<ul style="list-style-type: none"> • Technologist-in-training performs mammograms independently, requesting assistance if needed. • Technologist-in-training continues to have cases checked until the end of training. • Technologist-in-training must complete and record 300 mammograms under the close supervision of an experienced Technologist.

12.9 Canadian Breast Cancer Foundation (Atlantic) Funding

Meeting, achieving and maintaining high quality screening has largely been due to grants awarded since 1997 to the NSBSP by CBCF. The NSBSP acknowledges and thanks CBCF for funding over the years providing the women of Nova Scotia dedicated breast screening and shares the vision of a future without breast cancer.

Past NSBSP Funding:

1997	\$36,000	toward purchase of Mobile 2
1997	1,500	film encoder
	15,000	mammoviewer for NSBSP-Halifax
1998/99	40,000	breast ultrasound equipment-Halifax
1999	30,000	computer hardware for Infostructure Project
2000	20,000	completion of Infostructure Project
	50,000	x-ray equipment replacement Machine 1-Halifax
2001	50,000	diagnostic database hook-up to other hospitals *
2002	150,000	Mobile 3 purchase and operating costs
2003	35,000	x-ray equipment replacement Machine 2-Halifax
2004	42,000	purchase of two mammoviewers
2005	25,000	Radiologist Learning Tool and Reports
2006	60,000	purchase of three mammoviewers
2007	100,000	Purchase of ultrasound machine for breast imaging in Halifax
2007	35,000	Access to Breast Screening Services in Nova Scotia.
2007	35,000	Automation of the NSBSP Annual Report: a 1st step toward a surveillance system
2008	100,000	Toward FFD rollout
2008	53,000	Extending the Surveillance Capacity of the NSBSP
2008	44,679	Developing Empirically Based BI-RADS Scales Using Breast Density Measures from FFD - Part I
2009	52,292	Developing Empirically Based BI-RADS Scales Using Breast Density Measures from FFD - Part II
2011	100,000	Funding for digital upgrade of mainland mobile stops
2013	57,526	Invitation to Screening Project
Ongoing		Funding for The Intelligent Patient Guide
		Books included in the Pink Rose Kits
		Promotional Materials

13 Publications, Presentations and Posters

13.1 Publications

- Abdolell M, Tsuruda KM, Brown P, Caines JS, Iles SE. **Breast Density Scales: The Metric matters.** Br J Radiol. 2017 Oct;90(1078):20170307. doi: 10.1259/bjr.20170307. Epub 2017 Sep 8.
- Mohamed Abdolell, Kaitlyn Tsuruda, Christopher B. Lightfoot, Eva Barkova, Melanie McQuaid, et al. **Consistency of visual assessments of mammographic breast density from vendor-specific “for presentation” images,** J. Med. Imag. 3(1), 011004, doi: 10.1117/1.JMI.3.1.011004. Epub 2015 Oct 30. PMID: 26870747.
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- Abdolell M, Tsuruda KM, Lightfoot CB, Payne JI, Caines JS, Iles SE. **Utility of Relative and Absolute Measures of Mammographic Density versus Clinical Risk Factors in Evaluating Breast Cancer Risk at Time of Screening Mammography.** Br J Radiol. 2016 Mar;89(1059):20150522. doi: 10.1259/bjr.20150522. Epub 2015 Dec 21. PMID: 26689094
- Abdolell M, Tsuruda KM, Iles SE, Lightfoot CB, Payne JI, Caines JS. **Mammographic Density and Breast Cancer Risk in Full-Field Digital Mammography: A Matched Case-Control Study.** European Journal of Radiology (submitted).
- Payne JI, Martin T, Caines JS, Duggan R. **The Burden of False Positive Results in Analog and Digital Screening Mammography: Experience of the Nova Scotia Breast Screening Program.** Canadian Association of Radiology Journal. 2014; 65(4):315-20.
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- Rayson D, Payne JI, Abdolell M, Barnes P, McIntosh R, Foley T, Younis T, Burns A, Caines JS. **Clinical-Pathologic Characteristics and Outcomes of True Interval and Screen-Detected Invasive Breast Cancer Among Participants of a Canadian Breast Screening Program: A Nested Case-Control Study.** *Clinical Breast Cancer* 2011; (11) 1: 27-32.
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- Caines JS, Schaller GH, Iles SE, Payne JI. **Letter to Editor: Re: December 2005 issue of the Canadian Association Radiology Journal on Breast Imaging.** *CARJ* 2006; 57(3): 192-193.
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- Caines JS, Schaller GH, Iles SE, Woods ER, Barnes PJ, Johnson AJ, Jones GR, Borgaonkar JN, Rowe JA, Topp TJ, Porter GA. **Ten years of breast screening in the Nova Scotia Breast Screening Program, 1991-2001. experience: use of an adaptable stereotactic device in the diagnosis of screening-detected abnormalities.** *CARJ* 2005; 56(2): 82-93.
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- Judy S Caines, MD FRCP; Gerald H Schaller, MD FRCP; Sian E Iles, MD FRCP; Jennifer I Payne, PhD. **Stereotactic Needle Core Biopsy in Nova Scotia.**
- Olivotto IA, Bancej C, Goel V, Snider J, McAuley RG, Irvine B, Kan L, Mirsky D, Sabine MJ, McGilly R, Caines JS. **Waiting times from abnormal breast screen to diagnosis in 7 Canadian provinces.** *CMAJ* 2001; 165(3): 277-83.
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13.2 Poster Presentation (Contributed)

- M. Abdolell, K.M. Tsuruda, J.S. Caines, C.B. Lightfoot, J.I. Payne, S. Kuhle, D. Rayson, P. Brown, S.E. Iles. **Deriving a Risk-Based Breast Density Classification Scale for Population-Level Screening Using FFDM.** European Congress of Radiology (ECR), March 2017.
- M. Abdolell, K.M. Tsuruda, J.S. Caines, S.E. Iles, P. Brown. **Breast Density Scales: The Metric Matters.** European Congress of Radiology (ECR), March 2017.
- : M. Abdolell, P. Brown, K.M. Tsuruda, J. Payne, J. Caines, S.E. Iles. **Evaluating Performance of Automated Breast Density Algorithms When Correlation Is Necessary But Not Sufficient.** British Society of Breast Radiology Annual Scientific Meeting, 2017.
- M. Abdolell, K.M. Tsuruda, S.E. Iles*, J. Caines, C.B. Lightfoot, P. Brown, S.A. Raza, G.H. Schaller. **Disagreement between the 4th and 5th editions of the BI-RADS density lexicon.** European Congress of Radiology March 6, 2016. Vienna. (scientific presentation)
- M. Abdolell, K. Tsuruda*, C Lightfoot, JI Payne, JS Caines and SE Iles. **Utility of relative and absolute measures of mammographic density vs clinical risk factors in evaluating breast cancer risk at time of screening mammography.** European Congress of Radiology March 6, 2016. Vienna. (scientific presentation)
- Abdolell M*, Iles SE, Tsuruda K, Payne JI, Lightfoot CB, Caines JS. **The Role of Percent Area and Tabar Parenchymal Patterns of Mammographically Dense Tissue in Breast Cancer Risk Assessment.** Poster Presentation at the Annual European Congress of Radiology, Vienna, Mar 2-6, 2016.

- Abdolell M*, Tsuruda KM, Lightfoot CB, Brown P, Raza SA, Schaller G, Caines J, Payne JI, Iles S. The BI-RADS 5th edition density scale and breast cancer risk: a case-control study. Poster Presentation at the Annual European Congress of Radiology, Vienna, Mar 2-6, 2016.
- Greenlaw K*, Iles SE, Butt R, Yen P, Dakin-Hache K, Barnes P, Payne JI. Male Breast Disease: a Review of Radiologic Assessment and Accuracy, and Pathologic Variables over the past thirteen years. Poster Presentation at the Annual European Congress of Radiology, Vienna, Mar 2-6, 2016.
- Tsuruda K*, Abdolell M, Payne JI, Lightfoot CB, Caines JS, Iles SE. Reliability of Visual Percent Breast Density Measures Between CC And MLO Views. Poster Presentation at the Annual European Congress of Radiology, Vienna, Mar 2-6, 2016.
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- M. Abdolell, K.M. Tsuruda, E.E. McDougall, S. Iles, C.B. Lightfoot, J. Caines. Towards personalized breast screening protocols: validation of mammographic density estimation from full-field digital mammograms. European Congress of Radiology March 4, 2015. Vienna. (scientific presentation)
- K.M. Tsuruda, M. Abdolell, J. Payne, J. Caines, C.B. Lightfoot, S. Iles. Reliability of visual breast density assessments by radiologists between CC and MLO views of the same breast. European Congress of Radiology March 4, 2015. Vienna. (e-poster)
- M. Abdolell*, K. Tsuruda, S. E. Iles, J. I. Payne, C. B. Lightfoot, J. Caines. **Utility of breast density measures alone versus clinical risk factors in evaluating breast cancer risk in screening mammography.** Poster Presentation, European Congress of Radiology, Austria, Vienna. March 4, 2015
- Major D, Armstrong D, Bryant H, Cheung W, Decker K, Doyle G, Mai V, McLachlin C, Niu J, Payne J, Shukla N. Trends in cancer screening test use among women aged 50-69 in Canada. International Cancer Screening Network Meeting, Rotterdam, Jun 2-4, 2015.
- K. Tsuruda*, M. Abdolell, J. I. Payne, J. Caines, C. B. Lightfoot, S. E. Iles. **Reliability of visual breast density assessments by radiologists between CC and MLO views of the same breast.** Poster Presentation, European Congress of Radiology, Austria, Vienna. March 4, 2015
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- Payne JI. Overview of Research Activities in Breast Cancer Screening in NS. University of New Brunswick Cancer Screening Workshop. Fredericton, May 26, 2015

- K. Greenlaw, S. Iles , R. Butt , P. Yen, P. Barnes, K. Dakin-Hache, J. Payne. **Male Breast Disease: A Review of Radiologic Assessment and Accuracy.** Poster Presentation, Nova Scotia Health Quality Summit, Halifax, NS, Nov 18, 2015
- K. Greenlaw, S. Iles , R. Butt , P. Yen, P. Barnes, K. Dakin-Hache, J. Payne. **Male Breast Disease: a Review of Radiologic Assessment and Accuracy, and Pathologic Variables over the Past Thirteen Years.** Accepted Poster Presentation, European Society of Radiology, Vienna, Austria, Mar 2-6, 2016
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- M. Abdolell, S.E. Iles, K.M. Tsuruda, J.I. Payne, C.B. Lightfoot, J. Caines. Tabar parenchymal patterns and breast cancer risk: a case-control study adjusting for percent area mammographic density and standard risk factors. 18th SIS World Congress on Breast Healthcare, October 16-19, 2014. Orlando. (poster presentation)
- M. Abdolell, K.M. Tsuruda, J.I. Payne, C.B. Lightfoot, J. Caines, S.E. Iles. The role of percent area and Tabar parenchymal patterns of mammographically dense tissue in breast cancer risk assessment. 18th SIS World Congress on Breast Healthcare, October 16-19, 2014. Orlando. (scientific presentation)
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- Michael J*, Payne J, Tsuruda K, Abdolell M, Caines J, Iles S, Barnes P, Porter G, Younis T, Rayson D. **Triple negative breast cancer; a population-based description of clinical-pathological correlates and survival outcomes as a function of age at diagnosis.** Annual Meeting of the American Society of Clinical Oncology. Chicago, May 30-Jun 3, 2014.
- Michael J*, Payne J, Tsuruda K, Abdolell M, Caines J, Iles S, Barnes P, Porter G, Younis T, Rayson D. **Triple negative breast cancer; a population-based description of clinical-pathological correlates and survival outcomes as a function of age at diagnosis.** Annual Meeting of the Canadian Association of Medical Oncologists. Montreal, May 1, 2014.
- Abdolell M, Tsuruda K, Payne J, Schaller G, Iles S, Lightfoot C, Caines J. **Agreeing to Disagree: Assessing Inter-observer Variation in Breast Density Measurement.** European Congress of Radiology. Vienna, March 6-10, 2014.
- Abdolell M, Tsuruda K, Payne J, Schaller G, Iles S, Lightfoot C, Caines J. **Breast density from full-field digital mammograms and breast cancer risk: a case-control study.** European Congress of Radiology. Vienna, March 6-10, 2014.
- Abdolell M, Tsuruda K, Schaller G, Payne J, Iles S*, Lightfoot C, Roberts M, Caines J. Radiologists' Agreement on Mammographic Density from Full-Field Digital Mammographic Images and Validation of a Fully Automated Algorithm that Generates Reliably Reproducible Breast Density Measures. Presentation at the Annual Meeting of the Canadian Association of Radiologists Meeting, Montreal, April 25-28, 2013

- M. Abdolell*, K. Tsuruda. Will Knowledge of Breast Density be as commonplace as Knowledge of Blood Pressure? Atlantic Radiology Conference. Halifax, October 20, 2013.
- Abdolell M, Tsuruda K, Schaller G, Payne J, Iles S, Lightfoot C*, Roberts M, Caines J. **Radiologists' Agreement on Mammographic Density from Full-Field Digital Mammographic Images and Validation of a Fully Automated Algorithm that Generates Reliably Reproducible Breast Density Measures.** Annual Meeting of the Canadian Association of Radiologists. Montreal, April 25-28, 2013.
- Duggan RD*, Payne JI, Foley TJ, Caines JS. **Improving Wait Times Along the Breast Health Continuum.** Annual Meeting of the Canadian Association of Radiologists. Montreal, April 25-28, 2013
- Iles SE*, Caines JS, Duggan RD, Payne JI, Foley TJ. **3D Ultrasound: Utilizing a New Technology in a Diagnostic Breast Imaging Centre to Reduce Wait Times.** Annual Meeting of the Canadian Association of Radiologists Meeting, Montreal, April 25-28, 2013.
- Duggan RD*, Payne JI, Foley TJ, Caines JS. **Improving Wait Times Along the Breast Health Continuum.** Taming of the Queue 2013 Conference ,Ottawa, March 21-22, 2013.
- Abdolell M, Doyle G, Payne JI, Foley T, Caines JS, Duggan RD*, Barrington G. BIEMR: An Open Source Software Surveillance System Built on an EMR Framework. Poster Presentation at the International Cancer Screening Network Meeting, Sydney, Australia, October 23-25, 2012.
- Abdolell M, Payne J*, Doyle G, Caines J, Spears W. Breast Imaging EMR: A multi-province initiative. Poster Presentation at the National Health Leadership Conference. Halifax, Jun 4-5, 2012.
- M. Abdolell, G. Doyle, JI. Payne, J. Caines, T. Foley, R. Duggan*. The Breast Imaging Electronic Medical Record. CAISIS 2012 Fact to Face Meeting. Memorial Sloan-Kettering Cancer Center, NYC, NY, USA. March 7, 2012.
- M. Abdolell*, G. Doyle, JI. Payne, J. Caines, T. Foley, R. Duggan. The Breast Imaging Electronic Medical Record and Surveillance System: An Open Source Interprovincial Collaboration. 1st Annual Canadian Cancer Research Conference. Toronto, November 2011. (poster)
- Duggan R*, Foley T, Caines J. **Optimizing Mobile Service Delivery in Breast Screening in Nova Scotia, Canada.** International Cancer Screening Network Meeting. Sydney, October 23-25, 2012.
- Caines J, Duggan R, Iles S*, Payne J, Foley T. **3D Ultrasound: Utilizing a New Technology in Diagnostic Breast Imaging to Reduce Wait Times in an Organized Breast Screening Program.** International Cancer Screening Network Meeting. Sydney, October 23-25, 2012.
- Abdolell M, Doyle G, Payne JI, Foley T, Caines JS, Duggan RD*, Barrington G. **BIEMR: An Open Source Software Surveillance System Built on an EMR Framework.** International Cancer Screening Network Meeting. Sydney, Australia, October 23-25, 2012.
- MacInnes M, Payne J, Duggan R, Caines J, Iles S*. **Double Reads in the Nova Scotia Breast Screening Program.** International Cancer Screening Network Meeting. Sydney, October 23-25, 2012.
- Abdolell M, Payne JI*, Doyle G, Caines JS, Spears W. **Breast Imaging EMR: A multi-province initiative.** National Health Leadership Conference. Halifax, Jun 4-5, 2012.
- Abdolell M*, Doyle G, Payne JI, Caines J, Foley T, Duggan R. **The Breast Imaging Electronic Medical Record and Surveillance System: An Open Source Interprovincial Collaboration.** Canadian Cancer Research Conference. Toronto, November 27-30, 2011.

- Lea S*, Payne JI, Caines JS, Schaller G, Iles S. **Describing Service Provision of the Nova Scotia Breast Screening Program (NSBSP) to Nova Scotia Women Aged 50-69 Years from 2002-2006.** Annual Conference of the Canadian Association of Health Services and Policy Research. Halifax, May 9-12, 2011.
- Duggan R*, Foley T, Caines J. **Optimizing Mobile Service Delivery in Breast Screening.** Annual Conference of the Canadian Association of Health Services and Policy Research. Halifax, May 9-12, 2011.
- Payne JI, Schaller G, Caines JS*, Erdogan M. **Evaluating Change in Canadian Breast Screening Performance Indicators Following the Implementation of Full Field Digital Mammography in Nova Scotia, Canada.** Annual Conference of the American Roentgen Ray Society. Chicago, May 1-6, 2011.
- Abdolell M, Caines J, Gregson P, Payne J, Schaller G. **Developing BIRADS Classification Based on an Automated Mammographic Density Measurement Algorithm.** Beatrice Hunter Cancer Research Institute Annual Symposium. Halifax, Nov 8-9, 2010.
- Daniels C, Payne JI. **Mammography Then and Now.** Annual Congress of the South African Association of Physicists in Medicine and Biology. Stellenbosch, South Africa, Sep 15-17, 2010.
- Payne JI, Schaller G, Caines JS, Lea S. **Evaluating Change in National Breast Screening Performance Indicators Following the Implementation of Full Field Digital Mammography (FFDM).** Annual Meeting of the Canadian Public Health Association Conference. Toronto, Jun 13 - 16, 2010.
- Lea S, Payne J, Caines J, Schaller G, Iles S. **Describing Service Provision of the Nova Scotia Breast Screening Program (NSBSP) to Nova Scotia Women Aged 50 to 69 years from 2002-2006: Final Results.** Annual Meeting of the Canadian Public Health Association Conference. Toronto, Jun 13 - 16, 2010.
- Rayson D, Payne JI, Barnes PJ, MacIntosh RF, Burns AM, Abdolell M, Foley T, Younis T, Caines JS. **Clinical-pathologic characteristics of true interval and screen-detected breast cancer among participants in a Canadian breast screening program: A nested case-control study.** Annual Meeting of the College of American Pathologists. Washington, October 11-14, 2009.
- Caines JS, Payne JI, Iles SE, Schaller GH, Woods ER, Barnes PJ, MacIntosh RF. **The Nova Scotia Breast Screening Program and Core Biopsy: 15 Years of Follow-up.** Canadian Association of Radiologists, Montreal, October 22-25, 2006.
- Schaller GH, Payne JI, Caines JS. **Managing and Taming Wait Times and Participation Rates in a Small Population and Large Geographical Environment: A Proactive Approach.** International Breast Cancer Screening Network (IBSN) Biennial Meeting. Ottawa May 10-12, 2006.
- Caines JS, Schaller G, Payne JI, McDonald LJ, Gallant J, Foley T. **Radiological Review of Interval Breast Cancer Cases in the Context of Organized Screening.** Annual Meeting of the Radiological Society of North America. December 2008.
- Rayson D*, Payne JI, Barnes PJ, MacIntosh R, Abdolell M, Foley T, Younis T, Caines JS. **Clinical-pathologic characteristics of true interval and screen-detected breast cancer among participants in a Canadian breast screening program: A nested case-control study.** Poster Presentation at the Annual Meeting of the American Society of Clinical Oncology. Chicago, May 30-Jun 3, 2008.
- Abdolell M, Payne JI, Caines JS, Lou W, Stewart S*. **An open-source model for automated public health surveillance systems: the case of the Nova Scotia Breast Screening Program (NSBSP).** Annual Meeting of the Canadian Public Health Association Conference. Halifax, Jun 1 - 4, 2008.

- Abdolell M, Payne JI, Caines JS, Lou W, Stewart S*. **An open-source model for automated public health surveillance systems: the case of the Nova Scotia Breast Screening Program (NSBSP)**. Annual Meeting of the Statistical Society of Canada. Ottawa, May 25 - 29, 2008
- GIS and Health Program Evaluation: **The Nova Scotia Breast Screening Program**. Payne JI, PhD. Geomatics Atlantic Conference, Wolfville, Nova Scotia, June 5-8, 2006.
- Caines JS, Schaller GH, Payne JI, Chakravartty D. **GIS as a Tool to Evaluate Breast Screening**. International Breast Cancer Screening Network (IBSN) Biennial Meeting. Ottawa May 10–11, 2006.

13.3 Oral Presentations (Submitted Abstracts)

- M. Abdolell, K.M. Tsuruda, P. Brown, J.S. Caines, C.B. Lightfoot, S.E. Iles. Reproducibility of Automated Mammographic Density Measures Between Two Digital Mammography Device Vendors. European Congress of Radiology (ECR), March 2017
- M. Abdolell, K.M. Tsuruda, J. Payne, P. Brown, J.S. Caines, S.E. Iles. Utility of Using Mammographic Density and Clinical Risk Factors to Identify Higher Risk Women in an Average-Risk Screening Cohort. What is Necessary? What is Sufficient? British Society of Breast Radiology Annual Scientific Meeting 2017.
- Curtis H, Payne J. Breast Imaging in Nova Scotia. Presentation at the Annual Meeting of the Canadian Association of Medical Radiological Technologists. Jun 11, 2016.
- Abdolell M, Doyle G, Payne JI, Foley T, Caines JS, Duggan RD*, Barrington G. BIEMR: the Breast Imaging EMR. Oral Presentation at the International Cancer Screening Network Meeting, Sydney, Australia, October 23-25, 2012.
- Payne JI. Opportunities for Revising NSBSP Pathway to Include High Risk Women. Nova Scotia Breast Screening Program Continuing Medical Education event. Halifax, May 22, 2015.
- Payne JI. Breast Screening for High Risk Patients. Cancer Care Nova Scotia Provincial Cancer Network Meeting. Halifax, April 17, 2015.
- M. Abdolell*, K.M. Tsuruda, E.E. McDougall, S. Iles, C. Lightfoot, J. Caines. **Towards personalised breast screening protocols: validation of mammographic density estimation from full-field digital mammograms**. European Congress of Radiology, Austria, Vienna. March 4, 2015 NA NA
- Abdolell M*, Iles S, Tsuruda KM, Payne JI, Lightfoot CB, Caines JS. **Tabar Parenchymal Patterns and Breast Cancer Risk: A Case-Control Study Adjusting for Percent Area Mammographic Density and Standard Risk Factors**. Congress of Radiology, March 4 2015, Vienna. (Scientific Presentation)
- Abdolell M*, Tsuruda KM, Iles S, Payne JI, Lightfoot CB, Caines JS. **Towards personalized breast screening protocols: validation of mammographic density estimation from full-field digital mammograms**. European Congress of Radiology, March 4 2015, Vienna. (Scientific Presentation)
- Abdolell M*, Iles SE, Tsuruda K, Payne JI, Lightfoot CB, Caines JS. **The Role of Percent Area and Tabar Parenchymal Patterns of Mammographically Dense Tissue in Breast Cancer Risk Assessment**.. 18th SIS World Congress on Breast Healthcare, Orlando, Oct 16-19, 2014.
- Abdolell M, Tsuruda K, Payne JI*, Lightfoot CB, Caines JS, Iles SE. **Tabar Parenchymal Patterns and Breast Cancer Risk: A Case-Control Study Adjusting for Percent Area Mammographic Density and Standard Risk Factors**. 18th SIS World Congress on Breast Healthcare, Orlando, Oct 16-19, 2014. (Scientific Presentation)
- Abdolell M*, Tsuruda K, Iles S, Lightfoot C, Payne J, Caines J. **Fully automated breast density measures and breast cancer risk: a case-control validation study**. European Congress of Radiology. Vienna, March 6-10, 2014. (Scientific Presentation).

- Martin T*, Payne JI, Caines J, Foley T. **The Burden of False Positive Analog Screening Mammograms Experience of the Nova Scotia Breast Screening Program.** Annual Meeting of the Canadian Association of Radiologists Meeting, Montreal, April 25-28, 2013.
- Abdolell M, Doyle G, Payne JI, Foley T, Caines JS, Duggan RD*, Barrington G. **BIEMR: the Breast Imaging EMR.** International Cancer Screening Network Meeting, Sydney, Australia, October 23-25, 2012.
- Abdolell M, Doyle G, Payne JI*, Caines JS, Foley T, Duggan R. **The Breast Imaging Electronic Medical Record and Surveillance System.** World Cancer Congress. Montreal, August 27-30, 2012.
- Payne JI, Schaller GH, Caines JS, Lea S. **Evaluating Change in National Breast Screening Performance Indicators Following the Implementation of Full Field Digital Mammography (FFDM).** Annual Meeting of the Canadian Agency for Drugs and Technologies in Health. Halifax, April 18-20, 2010.
- Lea S*, Payne JI, Caines JS, Schaller GH, Iles SE. **Access to Breast Cancer Screening in Nova Scotia.** Annual Meeting of the Canadian Public Health Association Conference. Halifax, June 1 - 4, 2008.
- Abdolell M, Payne JI, Caines JS, Lou W. **Public Health Surveillance: wait times & the need for aggregation - The Nova Scotia Breast Screening Program.** Statistical Society of Canada Annual Meeting. St. John's, Newfoundland. June 9-11, 2007.
- Payne JI. **GIS as a tool for Nova Scotia Health Program Planning and Evaluation: Breast Screening and Diabetes Care.** Geomatics Atlantic Conference, Wolfville, Nova Scotia, June 5-8, 2006.
- Caines JS, Schaller GH, Payne JI, Chakravartty D. **GIS as a Tool to Evaluate Breast Screening.** International Breast Cancer Screening Network (IBSN) Biennial Meeting. Ottawa May 10–11, 2006.
- M. Abdolell*, G. Doyle, JI. Payne, J. Caines, T. Foley, R. Duggan. **The Breast Imaging Electronic Medical Record and Surveillance System: An Open Source Interprovincial Collaboration.** 1st Annual Canadian Cancer Research Conference. Toronto, November 2011. (presentation/panel)
- M. Abdolell*, JI. Payne, JS. Caines. **Automated reporting: using open source software to develop a sustainable real-time reporting infrastructure.** Data Technical Subcommittee of the Canadian Breast Cancer Screening Initiative, Public Health Agency of Canada. Vancouver, British Columbia. Oct. 2009.
- M. Abdolell*, JI. Payne. **Automated reporting: using open source software to develop a sustainable real-time reporting infrastructure.** Quality Determinants Working Group of the Canadian Breast Cancer Screening Initiative, Public Health Agency of Canada. Halifax, Nova Scotia. Sept. 2009.
- M. Abdolell*, JI. Payne, JS. Caines. **Public Health Surveillance: automated reporting using open source software.** Ontario Agency for Health Protection and Promotion. Toronto, ON. April 2009.
- M. Abdolell*, JI. Payne. **Public Health Surveillance: building capacity through automated reporting.** Nova Scotia Department of Health. Halifax, NS. February 2008.

13.4 Oral Presentations (Invited)

- Payne JI. **Organized Breast Cancer Screening in Nova Scotia: Implications of the 2011 CTFPHC Guidelines.** Presentation at Atlantic Radiology Conference. October 14, 2012.
- Duggan RD, Payne JI. **Breast Imaging in Nova Scotia.** Presentation to Dalhousie/QEII Radiology Rounds. Halifax, May 1, 2012.

- Payne JI. **National Guidelines for Breast Screening.** Presentation at CCNS Provincial Cancer Network Meeting. April 19, 2012.
- Payne JI. **Using GIS for Chronic Disease Surveillance and Program Evaluation: the case of the Nova Scotia Breast Screening Program.** Presentation to the GIS Infrastructure of the Office of Public Health Practice, Public Health Agency of Canada. Ottawa, May 30, 2008.
- Abdolell M, Payne JI. **Automation of the Nova Scotia Breast Screening Program Annual Report.** Presentation to the NS Department of Health Provincial Programs. Halifax, Feb 20, 2008.
- Abdolell M, Payne JI, Caines JS, Lou W. **Public Health Surveillance: beyond the disease atlas - The Nova Scotia Breast Screening Program.** Presentation to the Department of Public Health Sciences, University of Toronto, Toronto, ON. October 16, 2007.
- Payne JI. **Panelist Presentation: What can GIS do to help improve the health of populations?** Annual General Meeting of the Canadian Association of Radiologists, Montreal, October 22-25, 2006.
- **Overview of the NSBSP and the Potential of GIS as an Evaluation Tool.** Presentation to the Lunch and Learn Series of the Nova Scotia Breast Screening Program. Halifax, June 27, 2006.
- **Overview of the NSBSP and the Potential of GIS as an Evaluation Tool.** Presentation to the Nova Scotia Hospital Chief Executive Officers. Halifax, June 23, 2006.
- **Nova Scotia Breast Screening Program: Impact and Potential Growth.** Presentation to the NS Department of Health Provincial Health Services Operations Review (PHSOR). Halifax, June 23, 2006.
- **Overview of the NSBSP and the Potential of GIS as an Evaluation Tool.** Presentation to the Senior Leadership Team, Nova Scotia Department of Health. Halifax, June 12, 2006.
- **Overview of the NSBSP and the Potential of GIS as an Evaluation Tool.** Presentation to the Canadian Breast Cancer Foundation (Atlantic Chapter) Board of Directors and Annual General Meeting. Halifax, June 02, 2006.
- **GIS as a Tool to Evaluate Access to Breast Screening.** Presentation to Radiology Research Rounds, Dalhousie University. Halifax, April 25, 2006.

A Nova Scotia Breast Imaging Guidelines

Diagnostic Mammography

Patients who are symptomatic need to be seen by their health care provider to determine whether or not the breast problem warrants further investigation. If so, the health care provider must fax a requisition to the NSBSP Central Booking at 902-473-3959 or toll free at 1-866-470-3959. An appointment date and time will be issued and the requisition will be faxed back to the health care provider's office with this information included. The health care provider is required to notify the patient of the upcoming appointment. The requisition must indicate specific new signs or symptoms, or other reasons for diagnostic eligibility such as:

- 1st post surgical mammogram
- 6 month post core
- Implants
- Breast cancer survivors
- Women under the age of 40

Screening Mammography

Asymptomatic women over the age of 40 are able to call the Nova Scotia Breast Screening Program Central Booking office at 902-473-3960 or 1-800-565-0548 to book their screening mammogram provided they have not had a prior diagnosis of breast cancer or do not have implants.

Frequency

- Women aged 40-49 should talk to their health care provider to make sure screening is right for them. If they opt to join the breast screening program, annual screening is recommended.
- Women 50-69 should have screening mammography at two year intervals unless they have a strong family history of breast cancer (mother, sister, daughter, father, brother, son), are currently on HRT or the radiologist has recommended to return sooner. These women should be screened annually.
- Women over the age of 70 should continue to have screening mammography at two year intervals if they are in good health.

Ultrasound Guidelines

It is not recommended to use ultrasound as a screening tool. It may be utilized:

- as an additional test if an abnormality is seen on a mammogram
- as an additional test for a palpable abnormality
- as an initial test on women under the age of 30 if there is a palpable abnormality

6 Month Follow-up Breast Imaging

If requested by the radiologist from a previous mammogram, 6 month mammogram or ultrasound procedures should be booked. For sites reporting in the Breast Imaging System (BIS) these will be proactively booked by Central Booking NSBSP, otherwise a requisition is required to book these procedures.

6 months following a benign core biopsy a unilateral diagnostic mammogram of the affected breast is recommended. For sites reporting in the BIS these will be proactively booked by Central Booking NSBSP, otherwise a requisition is required to book these procedures.

Atypical Core Biopsy Procedure

Treatment following a core biopsy with a histological diagnosis of “atypical ductal hyperplasia” is followed-up similar to any borderline lesion. This should involve a surgical consult and probable excisional biopsy.

B Diagnostic Mammography Requisition

NSBSP Central Booking Office
Phone: 1-800-565-0548
Fax: 1-866-470-3959

Time Out:



NOVA SCOTIA
BREAST SCREENING
PROGRAM

Diagnostic Mammography Consultation Request
Requisition will be returned if the following information is not provided

Appointment Site Requested: Amherst Antigonish Bridgewater Dartmouth
 Halifax Kentville New Glasgow Sydney Truro Yarmouth

PATIENT INFORMATION

Health Card # _____
 Name _____ DOB _____ Tel# _____
 Address _____
 WCB # (where applicable) _____ MRSA/VRE Positive? Y N
 Mode of Transport: Ambulatory Chair Stretcher Portable
 If exam is for research purposes, provide Account #:

REQUESTED APPOINTMENT (For internal use only)

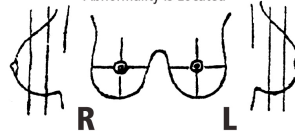
Date: _____
 Mammo Appt: _____
 Ultrasound Appt: _____
 Site Booked: _____

PLEASE INFORM PATIENT OF APPOINTMENT

EXAMINATION REQUESTED

Diagnostic Mammogram Breast Ultrasound
 Core Biopsy Galactogram
 Needle Localization Cyst Aspiration
 Breast MRI
 Other Examination (specify) _____
 Where appropriate, indicate Left Right

Use Diagram to Show Where
Abnormality is Located



COMMENTS (Please be specific)

CHECK WHERE APPROPRIATE

Nipple Discharge Nipple Retraction Palpable Area Peau D'Orange
 Breast Implants Erythema of Skin Ulceration Pain Tenderness

PATIENT HISTORY

Previous Breast Cancer Y N Date _____ Previous Biopsy Y N Date _____
 Previous Mammograms Y N Date _____ Previous Surgery Y N Date _____
 Screening Y N Date _____ Previous Radiation Y N Date _____
 Diagnostic Y N Date _____ Symptomatic Y N Date _____
 Previous Aspiration Y N Date _____

REQUESTING PHYSICIAN INFORMATION

Requesting Physician's Name: _____ Signature: _____
 Telephone: _____ Fax: _____ Date (YYYY/MM/DD): _____

TECHNOLOGIST INFORMATION (For internal use only)

Name _____ Room # _____
 18 x 24 _____ 24 x 30 _____

Your Health Matters

Nova Scotia Health

C Strategic Plan

The Strategic Plan has one primary goal and five strategic directions meant to guide the NSBSP in accomplishing its goal.

Primary Goal

The aim of the NSBSP is to continue to maintain a high quality breast imaging program in Canada by balancing excellence in centralized service co-ordination and the monitoring and evaluation of system performance.

Strategic Direction 1: Standards, Guidelines and Sustainability

Objectives

- Continue to set provincial breast imaging standards, guidelines, and policies in collaboration with stakeholders and in accordance with the Department of Health and Wellness Policy Division (Appendix F).
- Utilize data from provincial breast imaging system, published evidence, and best practices to inform the creation and revision of guidelines.
- Maximize sustainable access to screening mammography by addressing screening intervals for women over 70.
- Develop standardized guidelines for high risk breast cancer screening
- Identify requirements including resources and standardized technology to sustain technologist and radiologist expertise in breast imaging across the province via clinical services planning.

Strategic Direction 2: Partnerships/Collaborations/Knowledge Exchange

Objectives

- Increase communication with primary care providers.
- Increase collaboration with Provincial Cancer Program of Care at NSHA.
- Support the increased output of peer reviewed journal articles using NSBSP data.
- Increased provider/organization (e.g., NSHA and IWK) knowledge, skills and confidence to implement and achieve standards for breast imaging and outcome management.

Strategic Direction 3: Engagement of Women and Families

Objectives

- Increase awareness of breast screening services amongst the target population by working collaboratively with non-governmental supportive organizations such as CBCF
- Enhance promotion of and access to breast screening services for targeted populations identified as having below-average participation rates, (e.g. First Nations, African Nova Scotian, Acadian, Immigrant).
- Increase awareness of screening recommendations for women over the age of 70 and women at high risk.

Strategic Direction 4: Integrated Model of Service Co-ordination

Objectives

- Validate and formalize the integrated model of service co-ordination for breast imaging in Nova Scotia
- Ensure there is equitable access to breast screening and outcome management for people living in all regions of the Province
- Ensure all diagnostic breast imaging centres utilize the provincial breast imaging system to ensure appropriate followup and allow monitoring of standard of care
- Ensure all diagnostic breast imaging centres utilize proactive booking to reduce patient wait times and ensure appropriate followup
- Strengthen relationships with service delivery centers (screening and diagnostic).
- Promote NSBSP model on the national stage

Strategic Direction 5: Quality Improvement, Evaluation and Information Management

Objectives

- Maintain integrity of provincial breast imaging system, data structure and information relationships
- Interface breast imaging information system with the provincial Hospital Information System(HIS) and the Radiology Information System(RIS).
- Improve auditing capability of the provincial breast imaging information system
- Incorporate Active Directory into credentialing of users of the provincial breast imaging information system
- Improve usability of presentation/application layer of the provincial breast imaging information system